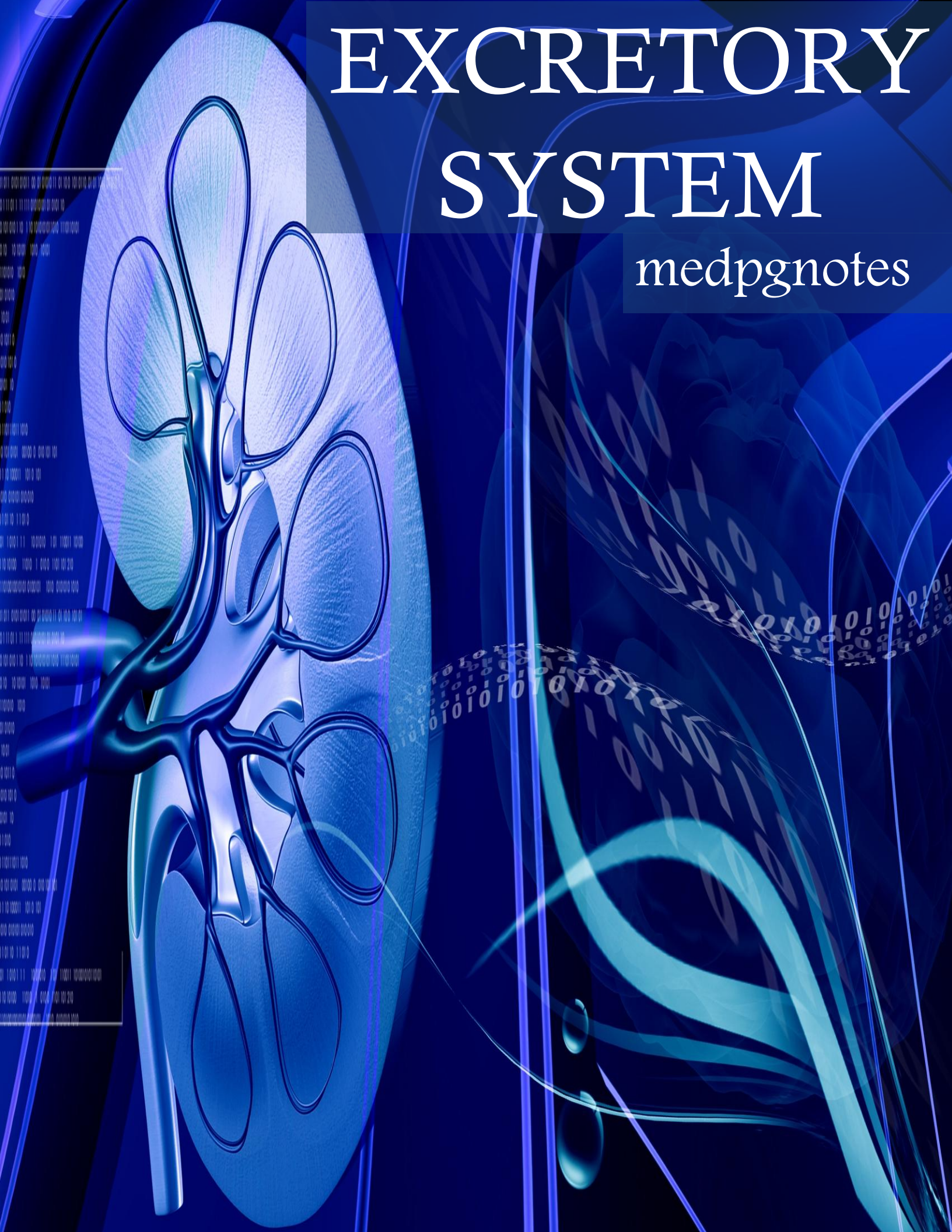


EXCRETORY SYSTEM

medpgnotes



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KEY TO THIS DOCUMENT

Text in normal font – Must read point.
Asked in any previous medical entrance
examinations

Text in bold font – Point from Harrison's
text book of internal medicine 18th
edition

Text in italic font – Can be read if
you are thorough with above two.

DEVELOPMENT OF EXCRETORY SYSTEM

<i>Kidney ascend to become abdominal organ by</i>	<i>5 – 8 weeks</i>
<i>Full number of nephrons at</i>	<i>36 weeks of gestation</i>
PCT develops from	Metanephric tubules
Collecting tubules of kidney develop from	Ureteric bud
Epithelium of ureter develops from	Mesonephros
Ureter develops from	Ureteric bud
Ureter develops from	Mesonephric duct
Trigone of bladder is derived from	Mesonephric duct
Derivative of mesonephric duct	Ureteric bud, Vas deferens, Trigone of bladder
NOT a derivative of Mesonephric duct	Rete testis
NOT derived from mesonephric duct	Renal parenchyma
NOT a derivative of Urogenital sinus	Ejaculatory duct
Defect of these may result in renal agenesis	Nephrogenic bud, ureteric bud, blastema of nephrogenic tissue
Renal agenesis	Defect in ascent of metanephron, Defective formation of nephritic tissue, effect of ureteric bud and mesonephros
Does NOT result in renal agenesis	Failure of descent of nephritogenic tissue to lumbar area
Urorectal septum separates cloaca into	Rectum and urogenital sinus
Urachus fistula	Patent allantois
Umbilical vesicle attains full development n	4 weeks
MC renal vascular anomaly	Supernumerary renal arteries
Accessory renal arteries	End arteries, NOT very rare, Vascular anomaly, 2-4 in number, Hydronephrosis
<i>Fetal kidney maturity is assessed by</i>	<i>Amniotic fluid creatinine</i>

ANATOMY OF EXCRETORY SYSTEM

GENERAL FEATURES OF ANATOMY OF EXCRETORY SYSTEM

Normal capacity of renal pelvis	7 ml
<i>Calices in each kidney</i>	<i>7</i>
<i>Column of Bertin</i>	<i>Intrapapillary extension of renal cortex</i>
Renal collar put around	Renal vein
Renal collar which surrounds aorta has its two limbs split by	Left renal vein
Each kidney contains	One million nephrons
Structure NOT present in renal medulla	Juxtaglomerular apparatus
Percentage of juxtamedullary nephrons of total nephrons	15%
Juxtamedullary nephrons depend on	Vasa recta
Length of DCT	5 mm

Macula densa in kidney is in close relation to	DCT
Column of Bellini in kidney	Tongue like papillary projection
Duct of Bellini are seen in	Kidney
Urethral crest is situated in	Prostatic urethra
Narrowest part of urethra	External meatus

ANATOMY OF KIDNEY

Total number of glomeruli at birth	9 lakh glomeruli
Right kidney	Renal vein is shorter than left, Related to duodenum, Right kidney placed at lower level than left
<i>Immediately anterior to hilum of kidney</i>	<i>Duodenum</i>
<i>Most anterior in renal sinus</i>	<i>Renal vein</i>
Anterior relations of kidney	SECOND part of duodenum, Liver, Hepatic flexure, Adrenal
Injured while exposing kidney from behind	Iliioinguinal nerve, Subcostal nerve, Iliohypogastric nerve
Structures liable to injury on exposing kidney from behind	Iliioinguinal nerve, subcostal nerve, iliohypogastric nerve
Relationship of structures at hilum of kidney from anterior to posterior is	Renal vein, renal artery, renal pelvis
NOT an anterior relation of right kidney	Third part of duodenum
NOT a posterior relation of both kidney	9 th rib
<i>Bloodless line of Brodel is seen in</i>	<i>Kidney</i>
<i>Brodel line</i>	<i>Two third of the way along a line from hilum to lateral margin of kidney</i>
Blood supply of kidney	NOT a portal circulation, Stellate veins drain superficial zone, Renal artery divides into five segmental arteries before entering hilum, Its segmental arteries are end arteries
NOT involved in anastomosis around kidney	Cortical arteries
Left renal vein	Posterior and inferior to superior mesenteric artery
Tributaries of left renal vein	Left adrenal vein, Left testicular vein, Diaphragmatic vein
<i>Renal fascia is fused posteriorly with</i>	<i>Fascia of psoas major muscle</i>
Cells belonging to this type of epithelium are provided with extra reserve of cell membrane	Transitional
Cells of kidney having secretory function	Type I medullary cells
Apical membrane of proximal tubular cells, expanded surface created by dense array of microvilli	Brush border
Brush border cells are found in	Proximal Convoluted tubule
Proximal convoluted tubule	Leaky epithelium with low resistance
Ansa nephroni (loop of Henle) is lined by	Squamous and columnar epithelium
Cuboidal epithelium lines	Distal convoluted tubule
Distal convoluted tubule	Tight epithelium with high resistance
Types of cells in cortical collecting duct	Principal cells – secrete K⁺ and reabsorb Water and Na⁺ - site of action of aldosterone and potassium sparing diuretics, Type A intercalated cells – acid secretion and bicarbonate reabsorption, Type B intercalated cells – Acid reabsorption and bicarbonate secretion

Maximum cold storage duration for kidney	48 hours
Cold ischemic time of kidney	48 – 72 hours
Cold ischemic time is extended by	University of Wisconsin solution (rich in lactobionate and raffinose)
Obliteration of Psoas shadow in X-ray	Hydronephrosis, Perinephric abscess, Retroperitoneal mass

ANATOMY OF URETER

Ureter	Starts at hilum, Changes direction at ischial spine, Enters pelvis in front of bifurcation of common iliac artery
Ureter	Gonadal vessel lies anterior to it
Ureter crosses	Uterine artery, Sigmoid mesocolon,
Ureter relation	Anterior to Internal iliac artery, Genitofemoral Nerve, Attachment of Mesentery
Left ureter is related to	Left gonadal vessels, Sigmoid mesocolon, Internal iliac artery
Anterior relations of right ureter	Descending part of duodenum, right colic and ileocolic vessels, lower part of mesentery, terminal ileum, vas deferens
Structures crossing right ureter anteriorly	Terminal ileum, Vas deferens, Right colic and ileocolic vessels
Structure NOT crossing right ureter anteriorly	Genitofemoral nerve (posterior)
NOT true	Ureter is above uterine artery
<i>Anatomical landmark for left ureter</i>	<i>Intersigmoid fossa</i>
<i>NOT true about ureter</i>	<i>Pelvic course is same in both males and females</i>
Lined by transitional epithelium	Ureterourethral junction
Ureter is lined by	Transitional epithelium
Urothelium does NOT line	Membranous urethra, Collecting duct
Blood supply of left ureter	Uterine artery, Inferior vesical artery, Testicular artery, Common iliac artery
Ureter derives its blood supply	Renal artery, Gonadal vessel, Common iliac artery, Inferior vesical artery
<i>NOT a blood supply of ureter</i>	<i>Inferior mesenteric artery</i>
Ureteric constriction	Ureteropelvic junction, Ureterovesicle junction, Crossing of iliac artery
Narrowest part of ureter	Ureterovesical junction
Narrowest part of ureter is at	Ureteropelvic junction
Ureter's entry into bladder	At lateral angle of trigone, Makes an angle Valveless, 25 cm long, Totally retroperitoneal, Enters true pelvis after crossing iliac vessel
Ureteric constriction NOT seen at	Ischial spine
Ureteric constriction is NOT seen at	Ischial spine
Autonomic ganglia is situated in ureter at	Lower Part
Ureter is diagnosed during operation by	Peristaltic movements
Ureteric peristalsis is due to intact supply of	Intrinsic smooth muscle pacemaker activity of renal calyces
Peristalsis of ureter depends upon	Pacemaker in smooth muscles of renal calyces

PHYSIOLOGY OF EXCRETORY SYSTEM

GENERAL FEATURES OF PHYSIOLOGY OF EXCRETORY SYSTEM

Urine production begins at	2 months
Urine formation in Intrauterine Life	3 months
Maximum urinary concentrating capacity in full term neonates	600 – 700 mOsm/Lit
Neonatal kidney concentrating capacity equal to adult kidney by	One year
Neonatal kidney achieves concentrating ability of adult kidney by	1 year of age
Resting ureteric pressure	0-5 cm of H ₂ O
Renal physiology	Distal tubule always receives hypoosmotic solution, Kidneys receive 25% of cardiac output, GFR is controlled by resistance in afferent and efferent arterioles, Glomerulus receives capillaries from afferent arteriole
Renal physiology	Sodium absorption occurs in DCT, Potassium is both secreted and absorbed in tubules
Only filtered in glomerulus	Tc 99 m EC
Important in renal excretion of hydrogen ions	Formation of bicarbonate from H ₂ O and CO ₂ by carbonic anhydrase
Sole channel of hydrogen ion excretion from body	Urine
Cells responsible for acid production in kidney	I cells
Acid is secreted by	IC cells (Kidney)
Filtration barrier in nephron	Podocytes, Endothelial cell, Basement membrane
Does NOT form a filtration barrier in nephron	Mesangium
Tubuloglomerular feedback is mediated by	Macula densa
Tubuloglomerular feedback is mediated by	Sensing NaCl concentration in macula densa
Active reabsorption of sodium ions in kidney takes place in	Ascending limb of loop of henle, Distal tubule, Collecting duct
Potassium reabsorption in kidney occur	PCT
Aminoacids are reabsorbed in	PCT
Substance with Least renal clearance	Glucose
<i>Middle molecules are involved in pathogenesis of</i>	<i>CRF</i>
Size of middle molecules retained in uremia	500 – 5000 daltons
Albumin is first to appear in urine because	It has molecular weight slightly greater than molecules normally getting filtered
Normal kidney does NOT allow passage of	Albumin
Renal blood flow	20 % of cardiac output
Fluctuations in renal blood flow is regulated by	Myogenic reflex
Prostaglandins increasing renal blood flow	PGI ₂ , PGE ₂
Relaxation of mesangial cells of kidney is brought about by	C-AMP
According to myogenic hypothesis of renal autoregulation, afferent arterioles contract in response	Opening of Ca ²⁺ channels

to stretch induced by	
<i>Renal autoregulation</i>	<i>Minimizes the impact of changes in arterial blood pressure on renal Na⁺ excretion</i>
In urinary system disease, GI symptoms appear because of	Renogastric reflex
Less than 400 ml urine in 24 hours	Oliguria
Urine output less than 100 ml per 24 hours	Anuria
Schwartz formula for calculation of creatinine clearance in a child depends on	Age, Method of estimation of creatinine, Mass
NOT included in Schwartz formula for calculation for creatinine clearance	Severity of renal failure
Foley catheter 16 F means	16 mm outer diameter
Catheter material for long term use	Silicone

RENIN ANGIOTENSIN SYSTEM

JG cells	Smooth muscles cells of afferent arteriole
<i>JG cells</i>	<i>Modified afferent arteriolar cells. Baroreceptors</i>
<i>Macula densa</i>	<i>Modified DCT, chemoreceptor, activates JG cells</i>
Macula dense in kidney in relation to	DCT
JG apparatus in relation to	Glomerulus
<i>Lacis cells</i>	<i>Modified mesangial cells</i>
Kidney produce	Erythropoietin, Renin, 1,25 DHCC
Hormone NOT secreted by kidney	Angiotensin I
True about hormones	Renin – kidney, Renin substrate – liver, ACE – lung epithelium, Angiotensinogen – renal
Renin angiotensin system	Angiotensin is octapeptide, Aspartic acid is essential for rennin activity, Catalysis site of ACE contain Zn ⁺⁺
<i>Activation of rennin angiotensin system results in</i>	<i>Increased intravascular volume</i>
Renin	Converts angiotensinogen to angiotension I
Renin secretion is increased by	Increased Na ⁺ in PCT, Decreased Na ⁺ in DCT Renal ischemia, Afferent arteriolar low pressure, Sympathetic nerve stimulation
<i>Renin secretion is increased by</i>	<i>Prostaglandin</i>
Renin is secreted by	Juxtaglomerular cells
Renin levels in old age	High
<i>Rennin secretion is inhibited in</i>	<i>Hypervolemia</i>
<i>Rennin secretion is reduced by</i>	<i>Beta blocker</i>
Renin antagonist	Aliskerin
Direct renin inhibitor	Aliskerin
Physiologically inactive form	Angiotensin I
Angiotensin II	Constriction of afferent arteriole, Autoregulation of GFR, Secreted from endothelium, Release aldosterone, Increased sodium and water reabsorption

Angiotensin II	Vasoconstriction, Stimulation of thirst, Increases ADH, Aldosterone secretion
<i>Angiotensin II</i>	<i>Stimulates vasopressin, suppresses renin</i>
<i>Most potent vasoconstrictor</i>	<i>Angiotensin II</i>
<i>Angiotensin II is converted to angiotensin III by</i>	<i>Aminopeptidase</i>
Shortest peptide	Angiotensin III
NOT true about renin angiotensin system	ACE splits leucine valine bond, PRA is better than PRC

PHYSIOLOGY OF MICTURITION

Normal excretion of protein in urine per day	100 mg
Micturition can be initiated at low bladder volume of	10 ml
Bladder emptying cannot occur if volume below	100 ml
Urge for micturition is felt when the bladder is filled with	100 – 200 ml of urine
In a normal adult marked desire for micturition is felt	When about 300 – 400 ml of urine has collected in bladder
Elimination of waste product from a normal person requires minimal amount of urine of	500 ml
Post micturition dribbling is seen in	Collection of urine in U shaped curve of bulb of penis

GLOMERULAR FUNCTION

Glomerular filtration	Glucose concentration of glomerular filtrate is same as plasma, Constriction of afferent arteriole decreases glomerular hydrostatic pressure, Ureteric obstruction increases hydrostatic pressure of Bowman's space
<i>Most readily filtered by glomerular capillaries</i>	<i>Polycationic dextran with molecular weight of 25,000</i>
<i>Glomerular capillaries are supplied by</i>	<i>Afferent arterioles</i>
Freely filtered by kidney across glomerular capillaries	Glucose, Creatinine
Least filtered in Glomerulus	Inulin
Which of these is NOT filterable completely?	Inulin
Inulin clearance closely resembles	GFR
<i>GFR</i>	<i>Uv/p (v is volume per minute)</i>
GFR is increased when	Increased renal blood flow, Afferent arteriole dilates
NOT true about glomerular filtration	Glomerular oncotic pressure is less than that of filtrate
In a normal person at resting condition, GFR is	125 ml/min
Filtration pressure of glomeruli of kidney	15 mm Hg
<i>Filtration pressure is controlled by</i>	<i>Variation in caliber of arteriole</i>
Inulin clearance	125 ml/min
Effective renal blood flow in humans	625 ml
If a substance is present in concentration of 2 mg% in afferent arteriole and 0 mg% in efferent	It is freely filtered in glomerulus
Increased amount of para amino hippuric acid than recommended level cause, renal plasma flow	False low

What is implied, if a drug has more renal clearance than GFR	Drug is secreted in tubules
FALSE statement regarding criteria for substance used to measure GFR	It is reabsorbed by glomerulus
PAH is useful in estimating	Renal Plasma Flow
Best for Glomerular function studies	Inulin, PAH
Best test for GFR is with	Inulin
Substances used to determine filtration fraction	Inulin and PAH
<i>GFR is best measured by</i>	<i>Tc 99m MAG3</i>
<i>Normal filtration fraction</i>	<i>20%</i>
Renal plasma flow is estimated by	DTPA
<i>GFR is significantly increased by</i>	<i>Prostaglandins</i>

TUBULAR FUNCTION

Types of transport by tubules	Cellular transport, paracellular transport (tight junction associated pores)
Amount of substances filtered per minute minus the amount of substance that appears in urine	Tubular Reabsorption
If clearance of a substance is greater than GFR, then	Tubular secretion must be present
Site of lowest tubular fluid osmolarity during water diuresis	6
Most sensitive index of tubular function	Specific gravity of urine
Glucose symport occurs with	Na ⁺
Occurs along with glucose transport	Sodium symport
Renal threshold for glucose in renal glycosuria	Low
Nephron function	Osmolality of intratubular content in PCT is isotonic to surrounding interstitium
Fluid leaving PCT	Isotonic
Only filtered into renal tubules	DTPA
Transport maximum	Maximum reabsorption and secretion
Tubular maximum for kidney in practice is actually less than calculated value because	Different nephrons have different transport maximum
NO T _m value	Urea
T _m (tubular maximum) for glucose	375
Absorption of Potassium occurs in	PCT
Absorbed in PCT	Bicarbonate, Sodium, Phosphate
<i>Potassium is maximally absorbed in</i>	<i>PCT</i>
<i>Substances secreted in PCT</i>	<i>Organic acids, bases, oxalic acid, uric acid, bile salts, H⁺</i>
<i>Secreted in DCT</i>	<i>K⁺</i>
<i>Secreted in collecting duct</i>	<i>K⁺, H⁺</i>
PCT have	Aquaporin 1
PCT has	Na⁺ K⁺ ATPase
Bicarbonate is maximally absorbed in	PCT
Active reabsorption of glucose occurs in	Proximal tubule
In presence of vasopressin, greatest fraction of filtered water is reabsorbed in which part of nephron	Proximal tubule
Maximum absorption of water	Proximal tubule

<i>NOT secreted in proximal tubule</i>	<i>Phosphate</i>
Water reabsorption in tubules	Bulk of water reabsorption occurs secondary to Na ⁺ reabsorption
<i>Main driving force for water reabsorption in PCT</i>	<i>Active reabsorption of Na⁺</i>
Bulk of water reabsorption secondary to	Sodium reabsorption
<i>Part of nephron most impermeable to water</i>	<i>Ascending loop of henle</i>
Principal site of absorption of sodium	PCT
In presence of vasopressin, the greatest fraction of filtered water is reabsorbed in	Proximal tubule
Major portion of glomerular filtrate is absorbed in	Proximal segment
NOT absorbed from PCT	H ⁺
Absorbed in DCT	Water, Sodium, Chloride
NOT absorbed in DCT	Potassium
Water deprivation test is used to assess	Distal tubular function
<i>Function of late distal tubule and cortical collecting tubule</i>	<i>Reabsorption of sodium ions</i>
Bicarbonate	Extracellular concentration 25 mmol, Intracellular concentration 10 mmol. In kidney, bicarbonate is produced by carbonic anhydrase
Ion completely absorbed in tubules in a healthy individual of normal diet	HCO ₃ ⁻
NOT true about bicarbonate	7.5% solution gives 2 nmol

COUNTER CURRENT MECHANISM

Hyperosmolarity of renal medulla is due to increased content of	Na ⁺
Substances involved in countercurrent mechanism for maintaining medullary gradient	NaCl, urea, water
In high sodium content of filtrate in renal medulla is because	At the loop of Henle there is countercurrent mechanism
Increased medullary hyperosmolarity is due to	Increased Na ⁺ , Increased urea, Increased K ⁺
Prime driving force for counter current multiplier	Reabsorption of Na ⁺ in thick ascending limb
Ion NOT handled by loop of Henle	Urea
Minimum amount of urine that should be excreted to remove metabolic end products	500 ml

CONCENTRATION OF URINE

Principle site of acidification of urine	Collecting duct
Responsible for concentration of urine in kidney	Angiotensin II, Vasopressin, Aldosterone
NOT responsible for concentration of urine in kidney	Epinephrine
Hormone regulating tubular reabsorption of water in collecting duct	Aldosterone
Hypertonic urine is excreted due to absorption of water in	Collecting duct

Urinary concentrating ability of kidney is increased by	ECF volume contraction
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CONGENITAL DISEASES OF KIDNEY

GENERAL FEATURES OF CONGENITAL DISEASES OF KIDNEY

Incidence of Absent kidney	1:1400
<i>Ask Upmark kidney</i>	<i>Segmental hypoplasia</i>
Persistent fetal lobulation of adult kidney	Normal variant
MC renal vascular anomaly	Supernumerary renal arteries
MC congenital anomaly of upper renal tract	Duplication of pelvis
Flower vase pattern	Horse shoe kidney
<i>Level of fused lower poles in horse shoe kidney</i>	<i>L4</i>
<i>Horse shoe kidney</i>	<i>Associated with renal calculi, renal malrotation, kidneys are located in lower level than normal</i>
NOT true about horse shoe kidney	Spider leg appearance, Heminephrectomy improves function
<i>MC site of ectopic kidney</i>	<i>Pelvic brim (left side)</i>
Position of adrenal in ectopic kidney	Behind spleen
Ectopic ureter is commonly associated with	Dysuria
Ectopic ureter is associated with	Paradoxical incontinence
Ectopic ureter opening may be located at	Prostatic urethra, Seminal vesicle, Bladder neck
A 9 year boy presented with abdominal pain and recurrent UTI, IVP reveals duplication of left ureter. most likely site of ectopic opening	Prostatic urethra
<i>Vogt Meyer rule</i>	<i>In duplication of ureter, upper kidney opens in to distal ureter and lower kidney opens in to proximal ureter</i>
Ectopic ureter opening NOT located in	Bulbar urethra
<i>Post caval ureter is common in</i>	<i>Right side</i>
Potter's syndrome	Renal anomalies, Oligohydramnios, Flattened pons
Congenital PUJ obstruction	Associated with renal agenesis, bilateral in 10-15% of cases, can be diagnosed antenatally
<i>Investigation of choice to detect PUJ obstruction in utero</i>	<i>USG</i>
NOT true about congenital PUJ obstruction	Aberrant vessels is most common cause, Endoscopic pyelotomy is contraindicated
<i>Medullary sponge kidney</i>	<i>Autosomal dominant, Renal function is normal, papillary ducts in medullar dilated with small cyst</i>
Symptom of medullary sponge kidney	UTI
Symptom of medullary sponge kidney disease	UTI
Paint brush like appearance is seen in	Medullary sponge kidney
Ectopia vesicae	Ca bladder may occur, Incontinence of urine, Visible vesicoureteric reflex

Features of extrophy of bladder	Epispadiasis, posterior wall protrudes through defect, umbilical and inguinal hernia
For treatment of ectopic vesicae, which of the following bone is divided to reach the site	Iliac bone
NOT true about exstrophy of bladder	Cloacal membrane is present
NOT true about ectopia vesicae	Hypospadiasis
A 67 old man single gross episode of hematuria. An excretory urogram demonstrated a 1.5 mm round filling defect in right lower renal infundibulum. Best next study	USG
Congenital short urethra	Urethra is short
Acute urinary retention in a male child is due to	Meatal ulcer with scabbing

POLYCYSTIC KIDNEY DISEASE

Inheritance of Adult polycystic kidney disease	Autosomal dominant
Chromosomes involved in Type I and type II autosomal dominant polycystic kidney disease	Chromosome 16 and chromosome 4 (Polycystin)
<i>Diagnostic criteria for autosomal dominant polycystic kidney disease</i>	<i>Two or more cysts in one kidney and at least one cyst in contralateral kidney</i>
<i>Adult polycystic kidney is associated with</i>	<i>Mitral valve prolapse</i>
Autosomal recessive polycystic kidney disease	Chromosome 6 (Polyductin/Fibrocystin)
Associated with adult polycystic kidney disease	Berry aneurysm in circle of Willis
Renal failure in adult autosomal dominant polycystic kidney disease	Middle age
Adult PKD typically manifest in	3 rd decade
<i>MC manifestation of ADPKD in adults</i>	<i>Hypertension</i>
<i>MC extrarenal manifestation of ADPKD</i>	<i>Colonic diverticular disease</i>
NOT associated with adult polycystic kidney disease	Tricuspid valve prolapse
NOT true about adult polycystic kidney disease	Unilateral presentation
<i>Rovsing operation for</i>	<i>ADPKD</i>
Childhood polycystic kidney disease	Autosomal recessive
Bilateral Spider Leg Appearance, Bilateral smooth spider leg deformity	Polycystic Kidney
Polycystic kidney is associated with	Hepatic cyst and fibrosis
<i>Congenital hepatic fibrosis is associated with</i>	<i>PCKD type II</i>
In polycystic kidney disease, cysts are seen in	Liver, pancreas, spleen
Common extrarenal involvement of polycystic kidney disease	Hepatic cyst
Incidence of liver cyst in polycystic kidney disease	50%
<i>NOT true about polycystic kidney disease</i>	<i>Develop carcinoma of kidney</i>
NOT true about polycystic kidney disease	Hypertension is rare
Polycystic kidney NOT associated with cyst in	Brain, Lung
Polycystic kidney does NOT have cyst in	Lung
NOT true about polycystic kidney disease	Decompression of cyst leads to normal renal function
NOT true about polycystic kidney disease	Hypertension is rare
IVP of polycystic kidney disease show	Spider leg deformity

CYSTIC DISEASES OF KIDNEY

MC cause of abdominal mass in neonates	Multicystic dysplastic kidney
High risk of renal dysplasia in	Posterior urethral valve
MC renal cystic disease in infants	Unilateral renal dysplasia
Cylindrical dilatation of Renal tubules	Medullary Cystic disease
Nephrocalcinosis NOT seen in	Medullary cystic kidney
Medullary cystic kidney disease II is associated with	Gout
Medullary cystic disease of kidney best diagnosed by	Biopsy
Acquired cystic disease of kidney is associated with	Dialysis

NEPHRONOPHTHISIS

MC genetic cause of ESRD in childhood and adolescence	Nephronophthisis
Types of Nephronophthisis	Juvenile form – Kidneys shrunk, Infantile form – Kidneys large
<i>Juvenile nephronophthisis</i>	<i>Autosomal recessive, associated with retinal degeneration</i>
8 year old child, recurrent attack of polyuria, BP normal. short statured	Nephronophthisis
13 year old, nocturnal enuresis and short stature. Trace proteinuria with hyaline cast, NO red blood or white blood casts. bilateral small kidney MCU normal.lab values	Nephronophthisis
Nephronophthisis	Interstitial fibrosis, Cysts in medulla, 20% cases are non familial
NOT true about Nephronophthisis	Cortical tubular hypertrophy
DTPA scan of hypertensive young lady is normal.USG shows small kidney on left side. next investigation will be	Digital subtraction angiography

POSTERIOR URETHRAL VALVE

MC congenital anomaly of urinary tract	Posterior urethral valve
MC cause of urinary obstruction in male infant	Posterior urethral valve
High risk of renal dysplasia in	Posterior urethral valve
Posterior urethral valve commonly situated	Below verumontanum
Straining and dribbling in a male infant with recurrent urinary infection should lead to suspicion of	Posterior urethral valve
3 year old child, fever dysuria, gross hematuria, prominent suprapubic area. Dull on percussion. red blood cells no proteinuria	Posterior urethral valves
Posterior urethra best visualized by	Voiding cystogram
Most important investigation for posterior urethral valve	Micturating cystourethrogram
Posterior urethral valve in micturating cystourethrogram	Dilatation of posterior urethra

VESICoureTERIC REFLUX

MC underlying anomaly in child with recurrent UTI	Vesicoureteric reflux
Child with recurrent urinary tract infection is most likely to show	Vesicoureteric reflux
MC cause of renal scarring in a 3 year old child	Vesicoureteral reflux induced pyelonephritis
Vesicoureteric reflex common in	Newborn female
Primary grade IV-V vesicoureteric reflux in young children	Postnatal scarring may occur even in absence of UTI
Investigation of choice to demonstrate vesicoureteral reflux	Contrast micturating cystourethrogram
Investigation of choice for VUR	Voiding cystourethrogram
One month old male child presented with poor urinary stream since birth. investigation of choice	Voiding cystourethrography
What will be next investigation to be done in cause of 2 year old female with 1 st episode of UTI	Abdominal ultrasound
Vesicoureteric reflux is demonstrated by	MAG3-Tc99
A 6 months girl is having recurrent UTI,USG shows bilateral hydronephrosis.MCU shows grade IV vesicoureteric reflux	Prophylactic antibiotics
Treatment of choice for primary grade V VUR involving both kidneys in a 6 month old boy	Antibiotic prophylaxis
Treatment of choice for primary grade V vesicoureteric reflux involving both kidneys in 6 month old boy	Antibiotic prophylaxis
Treatment of choice for grade IV vesicoureteric efflux with recurrent UTI	Cotrimoxazole
4 month old female, grade IV vesicourethral reflux without dilatation of urinary bladder	Reimplantation of ureter
Treatment of choice in grade IV vesicoureteric reflux	Ureteric reimplantation

URETEROCELE

<i>Ureterocele is common in</i>	<i>Women</i>
<i>Ureterocele is associated with</i>	<i>Cystic enlargement of intramural part</i>
A 3 year old girl with recurrent UTI. On USG shows hydronephrosis with filling defect and negative shadow of bladder with no ectopic orifice	Ureterocele
Cobra head deformity	Ureterocele
Adder head appearance	Ureterocele

HYDRONEPHROSIS

Hydronephrosis in pregnancy is due to	Progesterone
Unilateral hydronephrosis is due to	Ureterocele, Carcinoma prostate
<i>Bilateral hydronephrosis is</i>	<i>Most unlikely to be palpable</i>
Rim sign on IVP	Hydronephrosis
In hydronephrosis, Isotope renogram is mainly useful in	Distinguishing between non obstructed system

Fetal hydronephrosis at 34 weeks gestation. Amniotic fluid is normal. Most appropriate management	Delivery at term followed by radiological evaluation
Surgery for Hydronephrosis	Anderson Hyne operation
Large hydronephrosis with dilated renal pelvis and cortical thinning of normal ureter. differential function of kidney 19%	Pyeloplasty

HYPOSPADIASIS

MC congenital anomaly of urethra	Hypospadias
Maternal use of which drug will cause Hypospadias in baby	Diethylstilbestrol
<i>Hypospadias is due to failure in development of</i>	<i>Urogenital fold</i>
Hypospadias	Circumcision in infancy is contraindicated, No treatment is required for glandular variety, Ventral Chordee, Hooded prepuce, Spatulated glans, Meatal stenosis, Bifid scrotum, Proximal opening of meatus
Commonest hypospadias	Glandular
Hypospadias in which penis is NOT curved in downward direction	Glandular
Hypospadias is associated with	Chordee
NOT true about hypospadias	Chordee is reversed after 5 years
NOT seen in hypospadias	Ectopic vesicae
NOT a feature of hypospadias	Cryptorchidism
In severe hypospadias, possibility of an intersex problem is settled by	Karyotyping
Treatment of hypospadias	Meatotomy
Best time for surgery of hypospadias	6-10 months
Circumcision is NOT done in	Hypospadias

EPISPADIASIS

Epispadias	Less common than hypospadias
Epispadias is associated with	Chordee
Epispadias associated with	Dorsal chordate

PHIMOSIS AND PARAPHIMOSIS

Plastibel (Hollister) device is used for	Phimosis
Recommended treatment for prepuce adhesions producing ballooning of prepuce during micturition in a 2 year old boy	Circumcision
Treatment of phimosis	Circumcision
Paraphimosis	Iatrogenic, Gangrene of glans, Circumcision is treatment, Catheter induced, Hyaluronidase injection

PEYRONIE'S DISEASE

Fibrosing plaque in corpora cavernosa	Peyronie's disease
Palpable fibrous plaques on dorsal penile shaft indicates	Peyronie disease
<i>Penile calcification is seen in</i>	<i>Peyronie disease</i>
NOT true about Peyronie's disease	Affect adolescent males
NOT true about Peyronie's disease	Medical treatment is effective
NOT true about peyronie's disease	Affects adolescent males
Surgery for Peyronie's disease	Nesbitt operation

PRIAPISM

Persistent priapism in children may be due to	Leukemia
<i>Low flow priapism</i>	<i>Painful, drugs used for treatment</i>
NOT an indication of penile angiography	Painful priapism
Priapism is NOT seen in	Leiriche syndrome

ACUTE RETENTION OF URINE

Causes of acute retention of urine	Meatal ulcer with scabbing, Hemorrhoidectomy, Fecal impaction
Catheterization in acute retention of urine done in	Post operative, Carcinoma prostate
Catheterization should NOT be done in case of acute retention of urine due to	Stricture urethra, Rupture urethra

GLOMERULAR DISEASES

GENERAL FEATURES OF GLOMERULAR DISEASES

<i>Heparan sulphate in glomerulus is</i>	<i>Negatively charged</i>
MC membranous deposit	Subepithelial
Sub epithelial deposits are seen in	PSGN, RPGN, membranous GN, lupus V
<i>Sub endothelial deposits</i>	<i>MPGN type I, lupus III, IV</i>
Low complement levels are seen in	PSGN, MPGN, Infective endocarditis
Low C3 level	PSGN, Membranoproliferative Glomerulonephritis, systemic lupus erythematosus, Infective endocarditis
Bilaterally enlarged kidneys seen in	Polycystic kidney disease, Amyloidosis
Bilateral contracted kidneys characteristically seen in	Benign nephrosclerosis
Granular contracted kidney	Benign nephrosclerosis, chronic pyelonephritis, chronic glomerulonephritis
NOT a cause of granular contracted kidney	Diabetes mellitus
Flea bitten kidney	SABE, malignant hypertension, Hemolytic uremic syndrome
Glomerulonephritis is due to	Immune complex deposition

Most specific finding in acute glomerulonephritis	WBC
Heymann rat glomerulonephritis	Deposition in subepithelial aspect of basement membrane, Heymann antigen is called Megalin, antibodies to megalin antigen complex
Heyman nephritis	Animal model of membranous glomerulopathy
Reflux nephropathy is associated with	Focal segmental glomerulosclerosis
NOT a feature of acute diffuse proliferative glomerulonephritis	Hypoalbuminemia
ANCA associated crescentic glomerulonephritis	Pauci immune in nature, seen in Wegener's granulomatosis, Microscopic polyangiitis
Crescentic glomerulonephritis NOT seen in	Alport's syndrome
Non proliferative glomerulonephritis	FSGS, Membranous glomerulonephritis, amyloidosis
NOT a non proliferative glomerulonephritis	Mesangiocapillary glomerulonephritis
Characteristic feature of Diffuse Glomerular Sclerosis	Capillary basement membrane thickening, Nodular Glomerulosclerosis, Diabetic Glomerulosclerosis
Glomerulosclerosis is a feature of	Hypertension, Diabetes Mellitus
Microalbuminuria	30 – 300 mg/day
Mainly excreted in urine in glomerular disease	Albumin
Microscopic hematuria with proteinuria	Hemolytic uremic syndrome, Hepatorenal syndrome, Malignant hypertension
Hematuria of glomerular origin is characterized by	Red cell casts, crenated red cells, dysmorphic RBCs
Urinalysis showing hematuria and hypercalciuria likely to be associated with	Isomorphic RBC
<i>Causes of macrohematuria</i>	<i>Henoch Schonlein purpura, interstitial nephritis, polycystic kidney disease</i>
Creatinine clearance test is used to assess	Glomerular filtration
Most accurate method to assess decline in GFR during early stages of renal failure	Creatinine clearance
Creatinine clearance	May overestimate the actual GFR as renal function declines
<i>Renal biopsy is done with</i>	<i>Tru cut needle</i>

MINIMAL CHANGE DISEASE

Minimal change disease	Glomerular function is lost due to loss of polycharge on both side of glomerular foot process
Minimal change disease	Appears normal in light microscopy but electron microscopy show loss of foot process
Minimal change glomerulopathy	HIV, drug induced interstitial nephritis, Hodgkin's disease
Lipoid nephrosis	Normal light microscopy, Effacement of foot process
<i>Lipoid nephrosis produce changes in</i>	<i>Epithelium</i>
NOT steroid resistant	Minimal change disease
NOT a clinical feature of minimal change disease	Hypertension

NEPHROTIC SYNDROME

MC gene defect in idiopathic steroid resistant nephrotic	NPHS2
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syndrome	
Steroid resistant nephrotic syndrome	Podocin
Finnish type of nephrotic syndrome is associated with	Nephrin
MC mutation in congenital nephrotic syndrome	Nephrin
Causes of Nephrotic syndrome	Amyloidosis, gold therapy, proliferative glomerulonephritis, diabetic nephropathy
Causation of nephrotic syndrome	Gold, Ibuprofen, Captopril
MC cause of Nephrotic Syndrome in Children	Minimal Change Disease
MC cause of Nephrotic Syndrome in Adults	Membranous Glomerulopathy
MC cause of nephrotic range proteinuria in adults	Diabetes mellitus
Increased AFP is associated with	Congenital nephrotic syndrome
Edema in nephrotic syndrome is due to	Hypoalbuminemia, Sodium and water retention
Edema in nephrotic syndrome due to	Reduced oncotic pressure
MC cause of Primary Renal Vein Thrombosis in Adults	Nephrotic Syndrome
Essential feature in Nephrotic syndrome	Proteinuria
Nephrotic syndrome	Low serum calcium, Platelet activation, Decreased HDL
Nephrotic syndrome	Normal BP, massive proteinuria, hyperlipidemia, generalized edema, Normal blood urea
Nephrotic syndrome in children	Minimal change disease, MPGN, FSGS, Membranous nephritis
Nephrotic syndrome	Low serum calcium
Lipid crystals are seen in epithelial cell in urine	Nephrotic syndrome
Thyroid binding globulins decreased in	Nephrotic syndrome
Increases susceptibility to coronary artery disease	Nephrotic syndrome
Nephrotic syndrome patient on long standing corticosteroid therapy may develop	Hyperglycemia, neuropsychiatric symptoms, suppression of pituitary adrenal axis, atrophy of muscles
Cause of hypercoagulation in nephrotic syndrome	Loss of antithrombin III
MC cause of Spontaneous bacterial Peritonitis in Nephrotic Syndrome Child	Streptococcus pneumonia
Primary Peritonitis with Pneumococcus associated with	Nephrotic syndrome
DOES NOT decrease in Nephrotic syndrome	Fibrinogen
NOT a predominantly Nephrotic syndrome	IgA nephropathy
<i>Relative prominence of alpha 2 band in serum protein electrophoresis</i>	<i>Nephrotic syndrome</i>
Protein bound iodine does NOT measures secretory function of thyroid in	Nephrotic syndrome
In a patient with nephrotic syndrome and hypoalbuminemia, protein binding of which drug will NOT be affected	Morphine
NOT true about nephrotic syndrome	RBC casts in urine
Nephrotic syndrome responding well to steroids. finding in light microscopy	No finding
Electron microscopic finding of nephrotic syndrome	Fusion of foot process of glomerular epithelial cells
Major advantage of alternate day prednisolone	Less adrenal suppression
Nephrotic syndrome treated with corticosteroids showed cushingoid features, subcapsular cataract. Next drug	Cyclophosphamide

POST STREPTOCOCCAL GLOMERULONEPHRITIS

<i>Nephritogenic strains of group A streptococci</i>	12 - throat, 49 - skin
<i>Nephritogenic strains of group A beta hemolytic streptococci</i>	1, 4, 12
PSGN	Prototype for acute endocapillary proliferative glomerulonephritis, more common in males
MC type of Nephritic syndrome in children	Post Infectious Glomerulonephritis
Nephritic syndrome may be caused by	Plasmodium malariae
Post streptococcal glomerulonephritis	Glomerulonephritis secondary to skin infection is common in summer
Post infectious glomerulonephritis present as	Nephritic syndrome
Post streptococcal glomerulonephritis is differentiated from benign essential hypertension by presence of	Throat infection
Maximum endocapillary proliferation is a feature of	Post streptococcal glomerulonephritis
Feature of PSGN	Diffuse involvement
Hematuria, Increased BP, Edema, Oliguria	Nephritic syndrome
Presenting with hematuria 15 days after URTI	PSGN
Hematuria with dysmorphic RBC	Acute glomerulonephritis
<i>PSGN with starry sky pattern</i>	<i>Good prognosis</i>
<i>PSGN with garland appearance</i>	<i>Poor prognosis</i>
Condition that does NOT lead to CRF	PSGN
NOT a feature of Nephritic Syndrome	Lipiduria, polyuria
Serum C3 is NOT persistently low in	Post streptococcal glomerulonephritis
Diagnostic cast of Acute Glomerulonephritis	Red cell casts
ASO titre	Can be Increased in school children, may be negative in post streptococcal glomerulonephritis, may Not be elevated in 20% of carditis
Antistreptolysin titre in acute glomerulonephritis	Low
Diagnosis of Streptococcal Glomerulonephritis by	Anti DNAase, Anti Hyaluronidase

MEMBRANOUS GLOMERULONEPHRITIS

MC Renal Vein Thrombosis seen in	Membranous Glomerulonephritis
Subepithelial deposits with M spike	Membranous glomerulonephritis

MEMBRANOPROLIFERATIVE GLOMERULONEPHRITIS

MPGN/Atypical HUS	Complement factor H mutation
<i>Deposits in MPGN</i>	<i>Intramembranous</i>
MC renal lesion in leprosy	MPGN
Visceral leishmaniasis cause	Mesangioproliferative glomerulonephritis
<i>HbsAg is associated with</i>	<i>MPGN</i>
<i>Most common type of glomerulonephritis in infective endocarditis</i>	<i>MPGN 1</i>

Splitting of Glomerular basement membrane	Membranoproliferative Glomerulonephritis
A woman with hepatitis C with renal disease	MPGN
30 year old man, generalized edema and hypertension, subnephrotic proteinuria and microscopic hematuria. Serum complement levels decreased. he is positive for antihepatitis C antibodies	Membranoproliferative glomerulonephritis
60 year old woman, generalized edema and hypertension, subnephrotic proteinuria and microscopic hematuria. Serum complement levels decreased. he is positive for anti hepatitis C antibodies	Mixed cryoglobulinemia
<i>Test almost always abnormal in essential mixed cryoglobulinemia</i>	<i>Raised level of rheumatoid factor</i>
Glomerulonephritis that does NOT respond to steroids	Membranoproliferative glomerulonephritis
Type I MPGN	HBV, HCV. Associated with cryoglobulinemia and lupus. Tram tracking
Type II and Type III MPGN	Idiopathic
Dense deposit disease is	MPGN II
GBM appearance in MPGN	Tram track/Double contour appearance
Tram track appearance	Membranoproliferative glomerulonephritis
<i>Thickening of basement membrane of glomerulus</i>	<i>Membranoproliferative glomerulonephritis</i>

MESANGIOPROLIFERATIVE GLOMERULONEPHRITIS

Mesangioproliferative glomerulonephritis is seen in	IgA nephropathy, Plasmodium falciparum malaria, resolving post infectious glomerulonephritis, class II lupus nephritis
<i>Mesangioproliferative glomerulonephritis is also known as</i>	<i>Mesangiocapillary glomerulonephritis</i>

FOCAL SEGMENTAL GLOMERULONEPHRITIS

Reflux disease causing proteinuria of nephrotic range	Focal segmental glomerulonephritis
Worst Prognosis FSGN	Collapsing FSGN
Hallmark of FSGN	Degeneration & focal disruption of Visceral epithelial cells

FOCAL SEGMENTAL GLOMERULOSCLEROSIS

FSGS	TRPC6 cation channel mutation
<i>Mutation in FSGS</i>	<i>Alpha actinin 4</i>
MC Type of Focal Segmental Glomerulosclerosis	Not Otherwise Specified
HIV associated nephropathy is severe form of	Focal segmental Glomerulosclerosis
HIV infection results in	Focal segmental Glomerulosclerosis
<i>HIV associated nephropathy is morphologically characterized by</i>	<i>Collapsing variant of FSGS, focal cystic dilatation of tubule segments filled with proteinaceous material, large number of tubuloreticular incisions with endothelial</i>

	<i>cells</i>
Most Characteristic glomerulopathy in HIV	FSGS
Electron dense deposits in the region of hyalinosis and sclerosis, with diffuse loss of foot process, seen in electron microscopy of	Focal segmental glomerulosclerosis
Loss of foot process in electron microscopy	Lipoid nephrosis, FSGS
<i>Variant of FSGS with better prognosis</i>	<i>Hilar stalk lesion, glomerular tip lesion</i>
Biopsy for FSGS	Should be taken at glomeruli in corticomedullary junction, misdiagnosed as minimal change disease in superficial biopsy

COLLAPSING GLOMERULOPATHY

MC cause of Collapsing Glomerulopathy in Children	Cystinosis
HIV associated nephropathy is a type of	Collapsing glomerulopathy
Feature of collapsing glomerulopathy	Hypertrophy and necrosis of visceral epithelium
Renal vein thrombosis is associated with	Membranous glomerulopathy

IGA NEPRHOPATHY

MC cause of hematuria in young male	IgA nephropathy
Sympharyngitic Hematuria	IgA Nephropathy
Mesangial and paramesangial deposits are seen in	IgA nephropathy
Proliferative glomerular deposits in kidney	IgA nephropathy
Organized glomerular deposits in Kidney is NOT seen in	IgA nephropathy
IgA nephropathy seen in	Mesangioproliferative glomerulonephritis
Feature of renal vasculitis in children	Raised IgA
Commonest finding in patient with raised IgA	Hematuria
Gross hematuria with 80% dysmorphic RBC 2 days after attack of upper respiratory tract infection	IgA nephropathy
Berger's disease	Proliferative confined to mesangial cells usually focal and segmental. hematuria may be gross or microscopic. on immunofluorescence deposits contain both IgA and IgG
Berger nephropathy is due to mesangial deposits of	IgA and C3
Type of IgA in IgA nephropathy	IgA1
NOT true about IgA nephropathy	Absence of proteinuria
In IgA disease, mesangial cells express	CD71
<i>Light microscopy finding in IgA nephropathy</i>	<i>Focal</i>
IgA nephropathy. Protein excretion 130 mg/day. Most appropriate next step	Administer corticosteroids

RAPIDLY PROGRESSING GLOMERULONEPHRITIS

Linear IgG deposits are seen in	Rapidly progressive Glomerulonephritis
Crescents are seen in	RPGN

RPGN is histologically characterized by	Epithelial cell crescents
Hallmark in RPGN	Crescents
Crescents in RPGN are made of	Epithelial cell proliferation
<i>Hallmark of crescentic glomerulonephritis</i>	<i>Extensive extracapillary glomerulonephritis</i>
<i>Lumpy bumpy appearance</i>	<i>RPGN II</i>
Prognosis of RPGN depends on	Number of crescents
NOT a feature of RPGN	Rapid recovery
RPGN is NOT associated with	Minimal change glomerulonephritis, Diabetic nephropathy, Rheumatoid arthritis
ANCA is most sensitive and specific for	Idiopathic crescentic glomerulonephritis
Treatment for child with crescentic pauci immune glomerulonephritis	Prednisolone and cyclophosphamide

ALPORT SYNDROME

MC Hereditary Nephritis	Alport's Syndrome
<i>Collagen 4 has</i>	<i>6 genetically distinct alpha chains</i>
Mutation in alpha 5 chain of collagen 4	Alport syndrome
Defective gene in Alport syndrome	COL4A3-5
Presenting symptom of Alport syndrome	Hematuria
Recurrent hematuria in deaf mute child	Alport's syndrome
Anterior lenticonus	Alport's syndrome
Dot and Fleck retinopathy in	Alport's syndrome
Disease does NOT recur in kidney after renal transplant	Alport's syndrome
2 nd decade renal failure, 1 st degree relative also had same symptoms and died at the age of 28 and also had keratoconus	Alport's syndrome
Histology of Alport syndrome	Foamy cells in interstitium, Thinning of GBM < 100 nm
<i>Basket weave appearance of glomerular basement membrane is histological feature of</i>	<i>Alport syndrome</i>
Foam cells are seen in	Alport syndrome, Atherosclerosis, Niemann Pick disease
Electron microscopy is diagnostic in	Alport's syndrome
COL4A5 is associated with in	Alport's syndrome

GOODPASTURE SYNDROME

<i>Pulmonary renal syndrome without vascular injury</i>	<i>Goodpasture syndrome</i>
Type of collagen affected in Goodpasture syndrome	Alpha 3 of Type 4
Goodpasture syndrome	Anti GBM antibodies, hemoptysis, nephritis
Case on nephritis, hematuria and hemoptysis. antinuclear membrane antibodies	Goodpasture syndrome
Nephritis in Goodpasture's syndrome is due to	Anti GBM antibodies
Linear deposit of Immunoglobulins in Glomeruli	Goodpasture Syndrome
Goodpasture syndrome is characterized by	Necrotising hemorrhagic intestinal pneumonitis

Cause of death in Goodpasture Syndrome	Uraemia
Worse prognosis of Goodpasture syndrome	>50% of crescents in renal biopsy at presentation
NOT seen in goodpasture syndrome	Diffuse alveolar involvement
RBC cast in urine	Goodpasture syndrome
Anti Basement Membrane, pANCA are associated with	Goodpasture syndrome
Goodpasture syndrome	ANCA against myeloperoxidase
Plasmapheresis is treatment of choice for	Goodpasture syndrome

DIABETIC NEPHROPATHY

MC cause of end stage renal disease	Diabetic glomerulosclerosis
MC factor in development of diabetic nephropathy	Duration of diabetes
First clinically detectable sign of diabetic nephropathy	Microalbuminuria
MC Pattern of Involvement in Diabetic Nephropathy	Diffuse Glomerular Sclerosis
Pathognomic Lesion in Diabetic Nephropathy	Nodular Sclerosis/Intracapillary Glomerulosclerosis (Kimmelstein Wilson)
MC morphologic lesion in Diabetic Nephropathy	Diffuse
Characteristic feature of Diabetic Nephropathy	Kimmelstein Wilson Lesion
Earliest Abnormality in Diabetic Nephropathy	Thickening of Basement Membrane, mesangial widening
Pathological changes of diabetic nephropathy	Fibrin caps and capsular drops, intercapillary glomerulosclerosis, capillary basement membrane thickening
Kimmelstein Wilson disease is seen in	Diabetic Glomerulosclerosis
Preferred method of detecting microalbuminuria	Urine A/C ratio in a spot voided sample

CHRONIC GLOMERULONEPHRITIS

MC cause of Chronic Glomerulonephritis Worldwide	IgA Nephropathy
Periglomerular fibrosis is typical of	Chronic glomerulonephritis
Urinalysis in Chronic glomerulonephritis	Broad waxy casts

RENAL TUBULAR ACIDOSIS

<i>Normal anion gap renal tubular acidosis</i>	<i>Sjogren syndrome</i>
Anion gap NOT increased in	Renal tubular acidosis
Fever, paracetamol given subsided, then seizures, altered sensorium, urine examination oxalate crystals. blood anion gap and osmolality increased	Renal tubular acidosis
Type II and Type I RTA both associated with	Hypokalemia
NOT a feature of renal tubular acidosis	Alkaline urine, increased production of ammonia
Metabolic acidosis in RTA	Normal anion gap
Nephrocalcinosis in	Type I RTA
Citrate in type I RTA	Decreased
Positive urinary anion gap	Renal tubular acidosis-distal RTA
Urine K ⁺ excretion increased in	Chronic active hepatitis (Distal RTA)
NOT a feature of type I RTA	Fanconi's syndrome

NOT true about Type I RTA	Bicarbonate is more than 4
Associated with Type II RTA	Hyperaldosteronism, SLE, Amphotericin
<i>Growth retardation, hypophosphatemia and glycosuria is associated with</i>	<i>Type II RTA</i>
Citrate in type II RTA	Normal or increased
Fanconi syndrome	Type II RTA
<i>Lowe syndrome</i>	<i>Fanconi syndrome, congenital cataract, mental retardation</i>
Fanconi Bickel syndrome affects (Glycogen Storage disease type XI)	PCT (GLUT 2 gene)
Daily acid excretion high in	Type II RTA
Most Important feature in Proximal RTA	Bicarbonate Loss
NOT true about Type II RTA	Nephrocalcinosis
NOT true about Type II RTA	Cystinuria
Hyperkalemia is a feature of	Type IV RTA
Type of RTA in diabetes nephropathy	Type IV
<i>Tests for renal tubular acidosis</i>	<i>Ammonium chloride test, fludrocortisone furosemide test</i>

KIDNEY STONES

GENERAL FEATURES OF RENAL STONES

Hypocitraturia causes	Stones
<i>Drug that can cause nephrolithiasis</i>	<i>Indinavir</i>
<i>Age group for renal stones</i>	<i>30 - 50 years</i>
<i>Pain in renal stones</i>	<i>Lumbar region and loin</i>
<i>Pain in ureteric stone</i>	<i>Loin to groin</i>
<i>Pain in vesicoureteric junction stone</i>	<i>Pain along urethra</i>
Randall's plaque begins in	Basement membrane of thin limb of loop of Henle in Deep medulla
Randall's Plaque causes	Urinary stones
Triad of renal colic, swelling in loin which disappears after passing urine	Dietel's crisis
Percentage of Gouty individuals having Nephrolithiasis	10-20%
NOT seen in cystinosis	Renal calculi
Ureteric coli due to stone is caused by	Increased peristalsis of ureter to overcome obstruction
Pain radiating to medial side of thigh and perineum due to slipping of stone in males	At pelvic brim
Referred pain from ureteric colic is felt in groin due to involvement of	Genitofemoral nerve
Commonest presentation of bilateral ureteric stones	Pain
Ureteric colic	Acute onset, Responds to antispasmodics, Radiates to groin
23 year old male, pain in right iliac fossa, waveform pattern increased at night. mild hematuria on	Ureteral calculus

examination, urine examination plenty of RBC s pH 5.5	
Pain in flank radiating to thigh and burning micturition	Lower ureteric calculi
Streinstrasse	Ureteric obstruction due to fragments in ureter
NOT true about ureteric stone	Urine always infected, Should be removed immediately
Secondary vesical calculus include stone formed due to	Infection
NOT true about bladder stone	Jack stone is due to urea splitting bacteria
NOT true about bladder stone	Rare in Indian children
NOT true about endemic primary bladder stone	Always recur after removal
A 60 year male presents with hematuria at onset on micturition. Cause is	Urethral stone
<i>NOT true about acute renal colic</i>	<i>Sonography can detect ureteric stones sensitively</i>

TYPES OF RENAL STONES

Percentage of radio opaque renal stones	90%
MC vesical calculi	Uric Acid, 2 nd Struvite
Secondary vesical calculi	Stones from Infection
Stag horn calculi is seen in	Bladder
Renal calculi associated with Proteus infection	Triple phosphate
Type of renal stone in alkaline urine	Phosphate
Staghorn calculus is made of	Phosphate
MC Renal Stones in UTI	Phosphate/Struvite Stones
NOT true about struvite stone	Acidic urine
MC Renal Stones	Calcium Oxalate
<i>Calcium oxalate stones are</i>	<i>Spiky and hard</i>
<i>Prime hypercalciuria is associated with</i>	<i>Pyridoxine</i>
<i>Absorptive hypercalciuria is associated with</i>	<i>Sodium cellulose phosphate</i>
<i>Thiazides are associated with</i>	<i>Calcium oxalate stones</i>
<i>Jackstone calculus</i>	<i>Calcium oxalate</i>
MC cause of Calcium Oxalate stone	Idiopathic Hypercalciuria
Most severe pain in ureteric stone in case of	Oxalate stones
Urinary stone formed in patients with regional bowel enteritis	Calcium oxalate
Birefringent crystals in urine	Calcium oxalate
Jack stone calculus is seen in	Bladder
Oxalate stones are found in	Ethylene glycol
Radioluscent stone	Uric acid
<i>Allopurinol is associated with</i>	<i>Uric acid stone</i>
Commonest bladder stone	Uric acid
Stones most RESISTANT to Lithotripsy	Cysteine stone
<i>Drugs associated with cysteine stones</i>	<i>d-penicillamine, metacartopropionyl glycine stone</i>
<i>Typical pale yellow hexagonal or benzene crystals</i>	<i>Cysteine</i>
Hexagonal stones resistant to lithotripsy	Cysteine
NOT a radioluscent stone	Cysteine

DIAGNOSIS OF RENAL STONES

<i>Opacities on X ray confused for renal calculi</i>	<i>Calcified mesenteric node, concretions in appendix, phlebolith, ossified tip of 12th rib</i>
Investigation of choice for ureteric calculi in acute situation	Spiral CT
Most sensitive imaging modality for Acute Renal Stone	Non Contrast Helical CT Scan
Most sensitive imaging modality for diagnosis of ureteric stones in a patient with acute colic	Non contrast CT scan of abdomen
Calcification in right side abdomen in AP view. seen to overlies spine	Renal stones
Calcification is best detected by	CT scan
Substance present in gall stone or ureteric stone best identified by	X ray diffraction
Investigation NOT needed for renal stone	MRI, PET

MANAGEMENT OF RENAL STONES

Drug of choice for renal colic	Voveron
<i>Tiotroponin is used in management of</i>	<i>Cysteine stone</i>
<i>Drugs used in prevention of calcium stones</i>	<i>Thiazides</i>
NOT required for renal calculi	Calcium restriction
NOT a treatment of cysteine stones	d-penicillamine, Alkalinization of urine, Adequate hydration
Conservative management in ureteric stone	When stone size less than 6 mm in size
Most widely used and Least Invasive method of Ureteric Stone Removal	ESWL
A child presents with complain of abdominal colic and hematuria USG showed a renal stone 2.5 cm in diameter in renal pelvis. next step in management	ESWL
5 year old child presenting with a calculus of size 2 cm in upper ureter. He also complains of hematuria. USG shows no further obstruction	ESWL
<i>ESWL is NOT indicated in</i>	<i>Mid ureteric stone</i>
Contraindications of ESWL	Uncorrected bleeding diathesis, Pregnancy, Ureteric stricture
NOT a contraindication of extracorporeal shockwave lithotripsy for renal calculi	Stone in calyceal diverticulum
<i>High intensity shock waves in extracorporeal shock wave lithotripsy pass through</i>	<i>Water</i>
<i>Complications of shock wave lithotripsy</i>	<i>Steinstrasse (stone street)</i>
50 year female, abdominal pain and anuria, bilateral impacted ureteric stone with hydronephrosis. RBC with pus cells in urine. Serum urea and creatinine increased	J stent drainage
NOT a contraindication to percutaneous litholapaxy	Small stone

Treatment of lower ureteric stone	Endoscopic removal
10 mm calculus in right lower ureter associated with proximal hydroureteronephrosis is best treated with	Ureteroscopic removal
Dormia basketing is used for removal of stone in	Lower 1/3 of Ureter
Laser used for treatment of BPH and ureteric calculi	Holmium Yag laser
Stone disruption in ureteroscopy using	Holmium laser
Holmium YAG laser	2100 nm, effective against hardest urinary stone. even cut the wire of stone baskets
Indications of percutaneous nephrostomy	Stone removal, Ureteral obstruction, Renal tumor resection, Anterograde renography
Percutaneous nephrostomy indicated in	Pyonephrosis

NEPHROCALCINOSIS

Nephrocalcinosis	Sarcoidosis, Distal RTA, Milk alkali syndrome, Primary hyperparathyroidism, Vitamin D intoxication, Medullary sponge kidney, TB kidney, Hypercalcemia
Bilateral medullary nephrocalcinosis	Barter syndrome, ARPKD, prolonged use of frusemide
Male child Fanconi syndrome with nephrocalcinosis has a variant of Dent disease	Hypercalciuria, proteinuria, rickets
Dent's disease	X linked recessive, hypercalciuria, Disease of proximal convoluted tubule, defect in chloride channel 5
Cause of nephrocalcinosis in granulomatous disease	Increased absorption
Nephrocalcinosis is NOT associated with	Medullary cystic kidney
NOT a dietary recommendation for nephrocalcinosis	Calcium restriction
<i>Bartter syndrome</i>	<i>Hypokalemic metabolic alkalosis with hypercalciuria</i>
<i>Barter syndrome is characterized by</i>	<i>Normotension, hypokalemia and metabolic alkalosis</i>
Autosomal recessive Bartter syndrome	Type I - Sodium potassium chloride cotransporter defect, Type II - Potassium channel, Type III - Chloride channel, Type IV - Chloride channel accessory subunit Barttin, associated with sensorineural hearing loss
Autosomal dominant Bartter syndrome	Type V
Hyperprostaglandin E	Severe form of Bartter syndrome
Bartter syndrome	Polyuria, Metabolic alkalosis, Periodic paralysis, Normal blood pressure
Bartter syndrome	Hypomagnesemia, Hypokalemia, Hypercalciuria with nephrocalcinosis, Increased urinary PGE2
11 month boy, polyuria, delayed motor milestones. Medullary nephrocalcinosis. Lab values	Bartter's syndrome
WRONG statement about Bartter Syndrome	Hyperkalemic Alkalosis
NOT a feature of Barter syndrome	Hypertension
<i>HPE finding in Bartter syndrome</i>	<i>Juxtaglomerular hyperplasia</i>
Gitelman Syndrome is due to defect in	Na ⁺ Cl ⁻ cotransporter
Pseudoaldosteronism (Liddle syndrome)	Autosomal dominant, Epithelial Na⁺ channel, beta and gamma subunit, hypokalemic hypertension
Type I Pseudohypoaldosteronism	Recessive disorder, epithelial Na⁺ channel, alpha, beta and gamma subunit
Type II Pseudohypoaldosteronism (Gordon syndrome)	Mutation of kinases, associated with hyperkalemia and

	hypertension
<i>Hyperkalemia occurs in</i>	<i>Gordon syndrome</i>

RENAL TUBERCULOSIS

GENERAL FEATURES OF RENAL TUBERCULOSIS

Renal tuberculosis originate from	Renal papilla
MC route of infection in renal tuberculosis	Hematogenous
Earliest presentation of renal TB	Increased frequency of micturition
Genitourinary TB	Sterile pyuria is consistent finding
Sterile pyuria is seen in	Tuberculosis in kidney
Genitourinary TB presents	Microscopic hematuria
Autonephrectomy, Golf hole ureter, Thimble bladder, Golf stone mucosa	Renal tuberculosis
<i>Saw tooth IVU is a feature of</i>	<i>Renal tuberculosis</i>
Acid fast bacilli in urine	Bladder diseases is associated with extensive renal disease, Ureteric involvement causes shortening of ureters, Renal disease can cause changes identical to reflux nephropathy

DIAGNOSIS OF RENAL TUBERCULOSIS

Most sensitive imaging modality to detect early renal tuberculosis	IVP
Most sensitive investigation to detect early renal tuberculosis	Intravenous urography
Absolute contraindication for IVP	Allergy to drug

MANAGEMENT OF RENAL TUBERCULOSIS

Treatment of thimble bladder	ATT, Ileocystoplasty
<i>Optimum time of surgery after starting ATT</i>	<i>6 - 12 weeks</i>

RENAL TRAUMA

Renal trauma	Urgent IVP required, Renal artery aneurysm is common, Lumbar approach to kidney is preferred, Observation is best, Hematuria is common sign
Risk of rupture in renal artery aneurysm	20%

<i>Shattered kidney is</i>	<i>Grade 3</i>
NOT true about renal trauma	Exploration of kidney is to be done in all cases
NOT happen in unilateral renal trauma	Uremia
NOT true about pyonephrosis	Always unilateral
Appropriate investigation to find extent of renal injury	Contrast enhanced CT
Management of blunt trauma in kidney	Conservative
Renal trauma best treated by	Observation and supportive measures
Percentage of kidney injury requiring surgical exploration	20%
NOT done in renal injury following blunt trauma to abdomen	Heminephrectomy improves function

RENAL TUMORS

FEATURES OF RENAL TUMORS

Kidney tumors	Mutated VHL associated with clear cell carcinoma, Extreme hypoploidy seen
Carcinoma renal pelvis and ureter are associated with	Phenacetin, Balkan nephropathy (chronic interstitial nephritis in Bulgaria)
MC benign tumor during infancy	Hemangioma
Commonest type of cancer of renal pelvis and upper ureter	Transitional cell carcinoma
Epidermoid carcinoma of renal pelvis usually associated with	Pelvic calculus
24 year male, retroperitoneal necrotic heterogenous enhancing mass on CT near hilum of left kidney	Metastatic germ cell tumor
Central stellate scar on CT scan are seen in	Renal oncocytoma
7 year old boy. Left renal mass bone pain and metastasis	Clear cell sarcoma
An adult male c/o pain in left side of abdomen. On further examination, a heterogeneous mass is seen to arise in retro peritoneum at the level of left renal hilum possible diagnosis is	Lymphoma
Ideal approach for renal malignancy	Transperitoneal
NOT true about angiomyolipoma of kidney	Nephrectomy is the treatment of choice

RENAL CELL CARCINOMA

Most Important risk factor for Renal Cell Carcinoma (Grawitz tumor)	Tobacco
Renal cell carcinoma	Relatively radioresistant, Originate in cortex, May present with varicocele, Usually adenocarcinoma, Common in males, may invade renal vein, Arises from PCT
Clear cell and papillary carcinoma arise from	PCT

Chromophobe and oncocytic carcinoma arise from	Cortical collecting duct
Collecting duct carcinoma arise from	Medullary collecting duct
<i>Cancer associated with dialysis induced cystic disease of kidney</i>	<i>Papillary</i>
<i>Worst prognosis of renal cell carcinoma is associated with</i>	<i>Sarcomatoid</i>
Classical triad of RCC	Hematuria, Flank pain, Abdominal mass
<i>Renal cell carcinoma is common in</i>	<i>Males</i>
Signs of hypernephroma	Polycythemia, Renal vein thrombosis, hypertension
Cannon balls in lungs are characteristic of	Hypernephroma
Painless gross hematuria	Renal cell carcinoma
Cancer causing polycythemia	Renal cell carcinoma
MC cause of expansile Radioluscent Bone Lesion	Secondaries from Renal cell carcinoma & Thyroid
Expansile pulsating secondary metastasis is a feature of	Renal cell carcinoma
Cigarette smoker having left scrotal swelling. AFP and LDH negative. Diagnosis	Renal cell carcinoma
<i>Robson staging for</i>	<i>Renal cell carcinoma</i>
<i>Involvement of IVC in renal cell carcinoma</i>	<i>Stage T3c</i>
<i>Accurate diagnosis of involvement of IVC in renal cell carcinoma</i>	<i>MRI</i>
MC Histological type of Renal Cell Carcinoma	Clear Cell Carcinoma type of Adenocarcinoma
A 7 year old boy with left renal mass had bone pain and was detected to have bone metastatic deposits. most likely renal tumor	Clear cell sarcoma
Clear cell carcinoma associated with defect in	Chromosome 3p
Renal cell carcinoma associated with	Hypercalcemia, polycythemia, Cushing's syndrome
Renal cell carcinoma with histology showing perinuclear halo and plant like structure	Chromophobe variety
Chromophobe variant of renal cell carcinoma is associated with	Monosomy of 1 and Y
Cytogenetics of chromophilic renal cell carcinoma	Trisomy 7 or 17
MC Paraneoplastic Syndrome of Renal cell Carcinoma	Increased ESR
NOT a paraneoplastic syndrome associated with renal cell carcinoma	SLE
NOT an endocrine manifestation of RCC	Gastric ulcer
MC Metastasis of Renal Cell Carcinoma to	Lung
<i>Stauffer syndrome (non metastatic liver dysfunction)</i>	<i>Erythrocytosis, hypercalcemia, dysfibrinogenemia</i>
Most important prognostic factor for renal cell carcinoma	Pathological staging
Worst prognosis of renal cell carcinoma	Vascular invasion
Renal cancer NOT associated with	Lymphatic spread
NOT true about hypernephroma	More common in female
NOT true about Renal cell carcinoma	IVC invasion means inoperable
Investigation for Renal Cell Carcinoma	CT Scan
Treatment of renal cell carcinoma with tumor less than 4 cm size	Partial nephrectomy
8*8 solid mass in right kidney. 3*3 solid mass in upper pole of left kidney	Right radical nephrectomy and left partial nephrectomy

<i>Ideal approach for renal malignancy</i>	<i>Transperitoneal</i>
Structure NOT cut in left loin nephrectomy	Trapezius

WILM'S TUMOR

MC Malignant Abdominal Neoplasm in Children	Wilm's tumor
Similarities of neuroblastoma and Wilm's tumor	Calcification, aorta and IVC not eroded pushed aside, intraspinal extension of tumor
Wilm's tumor	WT1
Wilm's tumor WT1 gene	Chromosome 11 p13
Wilm's tumor metastasizes to	Lung
Childhood malignancy having highest cure rate	Wilm's tumor
Unfavourable form of Wilms tumor metastasizing to bone	Clear cell Sarcoma
Nephrogenic rests (Nephroblastomosis) indicate	Risk of developing Wilm's tumor in contralateral kidney
Presence of nephroblastomatosis in biopsy indicate	Chance of Wilm's tumor in opposite kidney increased
Cells derived from neural crest not involved in	Wilm's tumor
MC presentation of Wilm's tumor	Asymptomatic abdominal mass
Earliest symptom of Wilm's tumor	Abdominal pain
Solid circumscribed hypo echoic renal mass in 3 year old boy	Wilm's tumor
Abdominal USG in a 3 year boy show a solid circumscribed hypoechoic renal mass. Most likely diagnosis	Wilm's tumor
Child with abdominal mass. Right hand and leg are longer than left	Wilm's tumor
Aniridia, hemihypertrophy associated with	Wilm's tumor
<i>Stage IV Wilm's tumor</i>	<i>Distant metastasis</i>
<i>Stage V Wilm's tumor</i>	<i>Bilateral Wilm's tumor</i>
<i>Clear cell and sarcomatous variant are associated with</i>	<i>Bone metastasis</i>
<i>Rhabdoid variant of Wilm's tumor is associated with</i>	<i>Brain metastasis</i>
NOT true about Wilm's tumor	Hematuria almost always present
Wilm's tumor NOT associated with	Polycystic kidney
NOT true about Wilm's tumor	Preoperative use of actinomycin D
Most Important Prognostic factor for Wilm's tumor	Histology
Most important determinant of prognosis of Wilm's tumor	Stage of disease, Histology
Best prognosis in Wilm's tumor	Less than 1 year
Wilm's Tumor Pre Chemotherapy staging	NWTSG
Wilm's Tumor Post Chemotherapy staging	SIOP
Wilm's tumor best treated by	Surgery, Radiotherapy, Chemotherapy
Treatment of Wilm's tumor	Actinomycin D
Chemotherapeutic agent used in Wilm's tumor	Actinomycin D, vincristine
Emergence of resistance to chemotherapy in Wilm's tumor due to	Anaplasia
Post operative radiotherapy is beneficial in	Wilm's tumor

Post Op Radiation in Wilm's tumor should be started within	10 days of surgery
Wilm's tumor responds well to	Chemotherapy and radiotherapy

RENAL FAILURE

GENERAL FEATURES OF RENAL FAILURE

<i>Most common cause of cortical necrosis of kidney</i>	<i>Hypoxic ischemia</i>
Oliguric ARF is associated with	Hypocalcemia, Hyponatremia, Hyperkalemia, Hyperuricemia, Hypermagnesemia, hyperphosphatemia, Anemia
Non oliguric renal failure is typically associated with	Aminoglycoside toxicity
Renal insufficiency is associated with	Hyperphosphatemia
Drugs causing renal failure	Cephaloridine, Amphotericin B, Gentamicin
Renal damage due to amphotericin B due to	Azotemia, renal tubular acidosis, hypokalemia
Drug precipitating renal failure when used in cardiac failure	Indomethacin
Risk of aminoglycoside renal toxicity increased by	Elderly, hypokalemia, aminoglycoside administration in renal past
MC cause of post operative renal failure	Decreased renal perfusion
Fibronectin nephropathy	Autosomal dominant inheritance, Associated with mesangial expansion, Glomeruli do NOT stain for immunoglobulin or complement, PAS positive amyloid negative deposits
<i>Fibronectin nephropathy</i>	<i>Dense deposits disease</i>
Urinary ascites is due to	Injury to bladder during birth, Ureteric obstruction, Congenital urethral atresia, Urethral valves
Sudden onset of anuria elderly	Urinary tract obstruction
Nail and half nail sign seen in uremia	Increased capillary density at distal half of nails
Pathognomic of renal disease	Coarse granular cast
Important predictor of Progressive Overt Nephropathy	Microalbuminuria
In renal disease, albumin appear first in urine because	Has molecular weight slightly greater than the molecules normally getting filtered
Erythropoietin is absolutely essential for treatment of	End stage renal failure
<i>Antimicrobials need to reduced even in mild renal failure</i>	<i>Aminoglycoside, cephalixin, ethambutol, vancomycin, amphotericin B, acyclovir</i>
<i>Dose need not to be altered in renal failure</i>	<i>Erythromycin</i>
Dose NOT altered in compromised renal function	Doxycycline
Beta blocker NOT used in renal failure	Sotalol
NOT indicated in presence of renal failure	Spironolactone

ACUTE RENAL FAILURE

Causes of acute renal failure	Pre eclampsia, Malignant hypertension, Hemolytic uremic syndrome
Acute renal failure is due to	Mismatched transfusion, Eclampsia, Abruptio placenta
MC cause of Acute Renal Failure	Acute Kidney Injury
MC Form of Acute Renal Failure	Pre renal Azotemia
Causes of Pre renal azotemia	Hypovolemia, decreased cardiac output, impaired renal autoregulation (ACE inhibitors, ARB, NSAIDS, cyclosporine)
Causes of intrinsic renal failure	Ischemia, sepsis, nephrotoxins, rhabdomyolysis, myeloma
Causes of post renal failure	Bladder outlet obstruction, PUJ obstruction
28 year male, accident, sustained severe crush injury	Acute renal failure
Fractional excretion of sodium <1	Pre renal azotemia
Hypokalemia in infant NOT due to	Acute renal failure
A patient presents with acute renal failure and complete anuria. USG is normal. Best investigation for renal function	DTPA
USG can NOT detect	Severity of ARF
<i>RIFLE criteria is associated with</i>	<i>Acute kidney injury</i>
Markers for acute kidney injury	KIM-1, NGAL, IL-18
NOT a marker for Acute Kidney Injury	microRNA 222
Treatment of acute kidney injury due to scleroderma	ACE inhibitors
MC form of renal replacement therapy for AKI	Peritoneal dialysis
NOT used in renal failure	Streptomycin

ACUTE TUBULAR NECROSIS

Causes of acute tubular necrosis	Radiocontrast agent, Psrs proteins, Amphotericin B, Abruptio placenta
Most UNLIKELY cause of acute tubular necrosis	Rupture of aortic aneurysm
<i>Maintenance phase of acute tubular necrosis</i>	<i>GFR 10 mL/min</i>
<i>FENA (high fractional excretion of sodium) is typically seen in</i>	<i>Acute tubular necrosis</i>
Values suggestive of acute tubular necrosis	Urine sodium excretion > 20 mmol/L
Microscopic picture of ischemic necrosis of Kidney	Focal necrosis with skip lesion
Furosemide in acute tubular necrosis	Reduces hyperkalemia

PRERENAL AZOTEMIA

Prerenal azotemia	Urine sodium excretion < 10 mmol/L, Urine osmolality > 500 mosm/kg, Reversible with replacement fluids, Plasma BUN to creatinine ratio > 20:1
FeNa	Fraction of filtered sodium reabsorbed by tubules
Prerenal azotemia is characterized by	FENA <1%, urinary osmolality >500 mOsm/kg, reversible with replacement fluids
Pre renal failure	FENA <1, Urine Sodium < 10 mmol/L, Urine Osmolality

	>500, Renal failure Index <1
Pre renal azotemia and renal azotemia is differentiated on the basis of	Sodium fraction excretion
Fractional excretion of Na < 1 indicate	Prerenal azotemia
Plasma urea creatinine ratio of 20:1 may be seen in	Pre renal failure
Urine creatinine to plasma creatinine ratio	Pre renal azotemia > 40, Renal azotemia > 20

CHRONIC RENAL FAILURE

MC cause of chronic renal failure	Diabetes
<i>MC inherited cause of chronic renal failure in children</i>	<i>Nephronophthisis</i>
<i>MC inherited cause of chronic renal failure in adults</i>	<i>ADPKD</i>
CKD 0	GFR > 90%
CKD I	GFR > 90% with kidney damage
Mild or apparent decrease in GFR	Stage II of CKD
CKD V	GFR < 15%, also known as End Stage Renal disease
Clinical manifestation of CRF appear when renal function is reduced to	30% of normal
Signs and symptoms of renal failure evident	60%
Signs of CRF appear when renal function is decreased by	More than 60%
Overt symptoms of renal failure become evident when renal function deteriorated by more than	70-80%
Features of CRF	Impotence, Restless legs, Isothenuria, Broad cast in urine
<i>Chronic renal failure</i>	<i>Calciphylaxis, band shaped keratopathy, WBC cast</i>
<i>Calcium homeostasis in chronic renal failure</i>	<i>Secondary hyperparathyroidism, phosphate retention, reduced calcitriol production</i>
<i>Adynamic bone disease is likely to occur in</i>	<i>Chronic renal failure</i>
CRF commonly associated with	Metabolic acidosis
Bilateral small kidney is associated with	CKD
Calciphylaxis	Calcific uremic arteriolopathy, seen in chronic advanced CKD
Metabolic complication of CRF	Hyperkalemia and hypokalemia, hypernatremia and hyponatremia, hyperphosphatemia, hypocalcemia,
<i>Dermatological manifestation of end stage renal disease</i>	<i>Pruritis</i>
<i>RBC in chronic renal failure</i>	<i>Normocytic</i>
Anemia in CRF is due to	Decreased erythropoietin, Decreased RBC survival, Decreased folate, Bone marrow hypoplasia, Iron deficiency
Anemia in CRF is due to	Erythropoietin deficiency, Shortened Life span of RBC's, B12 deficiency
<i>Uremia occurs in chronic renal failure if GFR is reduced by</i>	<i>80%</i>

CNS manifestation in CRF because of	Hyperosmolarity, acidosis, hypernatremia
Rotting Fence Appearance	CRF (Due to combination of Rickets & Hyperparathyroidism)
Low and Fixed specific gravity of urine	CRF
<i>Urine of low specific gravity</i>	<i>Polakuria</i>
Restless leg syndrome	CRF
Renal osteodystrophy differs from nutritional and genetic forms of osteomalacia in having	Hyperphosphatemia
Type of glomerulonephritis least likely to have CRF	Post streptococcal glomerulonephritis
Glomerulonephritis usually do NOT cause chronic renal failure	Diabetes mellitus
Electrolyte imbalance NOT seen in CRF	Hypercalcemia
<i>ECG feature of patient with chronic renal failure</i>	<i>Peaked T waves, long QT, features of left ventricular hypertrophy</i>
Treatment of Restless leg syndrome	Ropinirole
Drug used safely in CRF	Chloramphenicol
Diuretic should NOT be used in CRF	Spironolactone

INTERSTITIAL NEPHRITIS

Methicillin can cause	Interstitial nephritis
Interstitial nephritis	Diuretics, Allopurinol, Isoniazid
Methicillin, beta lactams, diuretics, allopurinol	Interstitial nephritis
Interstitial nephritis NOT associated with	Beta lactamase inhibitors
Salt losing nephritis is a feature of	Interstitial nephritis
<i>Features of interstitial nephritis</i>	<i>Fever, rash, peripheral blood eosinophilia, eosinophiluria</i>
8 year old child BP 180/100. Urea 90, creatinine 5.3 urinalysis show 15-20 pus cell, 1-2 RBC, protein 1+ has no significant past history of similar complaint	Chronic interstitial nephritis with VUR
Treatment of classic allergic acute interstitial nephritis	Glucocorticoids

PAPILLARY NECROSIS

Necrotizing papillitis	Sickle cell disease, diabetes mellitus, analgesic nephropathy
Necrotizing papillitis	Salicylate poisoning, renal vascular thrombosis, diabetes mellitus, Tuberculous pyelonephritis – rare cause
Renal papillary necrosis is seen in	Phenacetin, Diabetes Mellitus, Acute Pyelonephritis, Alcohol
Drug commonly causing analgesic nephropathy	Phenacetin
Papillary calcification in garland pattern	Analgesic nephropathy
Almost always associated with renal papillary necrosis	Diabetes mellitus
Associated with renal papillary necrosis	Alcohol
Features of papillary necrosis	Egg in cup, Calyceal horn, Ring shadow
Test NOT done to investigate for papillary necrosis	Urine PCR for TB

ACUTE PYELONEPHRITIS

Emerging viral pathogen causing pyelonephritis in kidney allografts	Polyoma virus
<i>Isolated in urine of renal transplant patients</i>	<i>BK virus (polyoma family)</i>
Pyelonephritis is associated with	Picket Fence fever
Acute pyelonephritis and uncomplicated UTI differentiated by	WBC cast, Concentrating defect, Antibody to Tom Horsfall protein
NOT a feature to differentiate between acute pyelonephritis and uncomplicated UTI	Organisms in excess of 1 lakh cfu/ml
A boy suffering from acute pyelonephritis, most specific urinary finding	Bacteria in gram stain
Most specific urinary finding in acute pyelonephritis	WBC cast
Which is not seen in acute pyelonephritis	Hypoechoic
<i>NOT a feature of perinephric abscess</i>	<i>Pus cells in urine</i>

CHRONIC PYELONEPHRITIS

MC infectious agent associated with chronic pyelonephritis	Escherichia coli
MC predisposing factor for chronic pyelonephritis	Vesicoureteric reflux
Important factor for chronic pyelonephritis	Vesicoureteric reflex
Periglomerular fibrosis is typical of	Chronic pyelonephritis
<i>Corticomedullary scarring is associated with</i>	<i>Chronic pyelonephritis</i>

EMPHYSEMATOUS PYELONEPHRITIS

Common organism isolated from emphysematous pyelonephritis	E.coli
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XANTHOGRANULOMATOUS KIDNEY

A middle aged diabetic female presented with flank pain. On USG irregular fat density lesion with calculi.	Xanthogranulomatous kidney
Xanthogranulomatous pyelonephritis	Foam cells, yellow nodules, giant cells
Presentation of xanthogranulomatous pyelonephritis in children	Same as adults
Treatment of Xanthogranulomatous pyelonephritis	Nephrectomy

CHINESE HERB AND BALKAN NEPHROPATHY

Cause of Chinese herb nephropathy and Balkan nephropathy	Aristolochic acid
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HEMODIALYSIS

Artificial kidney	Hemodialysis
Criteria for dialysis in uremic state	Serum potassium level
Absolute indication on hemodialysis	Hyperkalemia of 6.5 mEq/L
Hemodialysis in ARF is NOT indicated in	Hyponatremia
Dialysate	High sodium concentration
Brescia – Cimino fistula	Cephalic vein anastomosed to radial artery
NOT a preferred site for planning vascular access for hemodialysis	Saphenofemoral fistula
Does NOT improve after dialysis	Peripheral neuropathy and seizures
MC complication of hemodialysis	Hypotension (due to acetate buffer, now bicarbonate buffer is used)
Dialysate reaction	Type A reaction is due to IgE, Type B reaction is due to complement and cytokines
NOT a complication of AV fistula made for dialysis	Deep vein thrombosis
NOT a complication of hemodialysis	Peritonitis, Hypertension
Preferred buffer in peritoneal dialysis	Lactate

RENAL TRANSPLANTATION

First autologous renal transplantation	Hardy
MC type of renal transplantation in India	Allograft
Graft best suited for renal transplantation	Isograft
Renal transplantation	Heterotopic, Cyclosporine is main stay of immunosuppression, Kidney after removal is flushed with cold perfusion solution
Renal transplantation is commonly done in	Chronic glomerulonephritis
Total number of HLA for renal transplantation	6
Absolute contraindication for Renal transplantation	Active malignancy
NOT a contraindication for renal transplantation	Stage V CKD
Kidney preferred for renal transplantation	Left kidney
<i>Donated kidney is kept in</i>	<i>Pelvic fossa</i>
Principal cause of death in renal transplant patient	Heart disease > Infection > stroke
NOT true about renal transplantation	In India harvesting from brain dead is not permitted by law
Infection in renal transplantation patient	CMV
<i>Late onset opportunistic infections in renal transplant recipient</i>	<i>Aspergillus, Nocardia, Polyoma (BK virus), herpes zoster, hepatitis B, hepatitis C</i>
<i>MC cause of heavy proteinuria and nephrotic syndrome occurring after renal transplantation</i>	<i>Chronic rejection</i>

Commonest malignancy in renal transplant recipient	Skin
Cancer associated with Renal Transplantation	Skin Cancer
Investigation of choice in early stage of renal transplant	USG
Management after renal transplantation	Adequate hemodialysis should be done within 48 hours of transplant surgery
<i>Recovery of renal function after renal transplant usually takes</i>	<i>1 month</i>

RENAL VASCULAR DISORDERS

RENAL ARTERY DISORDER

Renal artery stenosis occur in	Atherosclerosis, fibromuscular dysplasia, Takayasu arteritis
MC presentation of unilateral renal artery stenosis	Hypertension
Unilateral smooth kidney is seen in	Renal artery stenosis
Renal artery stenosis	NOT always bilateral
Renal artery stenosis may NOT occur in	Polyarteritis nodosa
Investigation of choice for renal artery stenosis	Arteriography
Gold standard investigation for renal arterial lesion	Contrast arteriography
<i>Best diagnostic test to determine the physiological significance of lesion</i>	<i>Renal vein rennin assay</i>
Most important sign of renal artery stenosis on angiogram	Presence of collaterals
Best management of bilateral renal artery stenosis in diabetic patient	Verapamil
Elderly hypertensive has diabetes mellitus and bilateral renal artery stenosis	Verapamil

RENAL VEIN DISORDER

Renal vein thrombosis	Membranous glomerulopathy, Membranoproliferative glomerulopathy, Renal amyloidosis, Lupus nephritis
Renal vein thrombosis may be seen in	Trauma, Renal cell carcinoma, Pregnancy, Nephrotic syndrome, Dehydration
MC cause of Primary Renal Vein Thrombosis in Children	Dehydration
10 year old child developed hematuria after 2 days of diarrhoea. Blood film show fragmented RBC and thrombocytopenia. ultrasound show marked enlargement of both kidneys	Renal vein thrombosis
Non visualization of kidney in excretory urogram is seen in	Renal vein thrombosis
Investigation of choice in renal cell carcinoma to evaluate inferior vena cava and renal vein thrombosis	Color Doppler

RENAL IMAGING

GFR is measured by	DTPA, MAG3
Renal function failure best evaluated by	DTPA, DMSA, Iodohippurate, MAG 3
I2 hippurate for	ERPF
Renal perfusion is assessed by	MAG3
Impaired renal function is assessed by	MAG3
Fractional analysis of kidney best done by	Radionuclide imaging
In a child, non functioning kidney is best diagnosed by	DTPA renogram
Patient presents with ARF and complete anuria. Normal ultrasound. Next investigation	Radiorenogram DTPA
Agent used to measure	Tc99m DTPA
Gold standard method for detection of renal scarring in patient with recurrent UTI	99TcDMSA scan
Investigation of choice for studying renal cortical mass	DMSA
Distribution of functional renal tissue is seen by	DMSA
Nephrogram shows	Collecting tubules
Isotope renogram	Graphical representation of radioactivity of kidney
Amount of dye used for ascending urethrogram	30 – 40 ml
Radiation exposure least in	Bilateral nephrostogram
Dense nephrogram is obtained by	Rapid or bolus injection of dye
<i>Rapid sequence excretory urography is done in</i>	<i>Suspected renovascular hypertension</i>
Dense persistent nephrogram	Acute ureteral obstruction, dehydration, Severe hydronephrosis
Dense persistent nephrogram NOT seen in	Systemic hypertension
Excretory urography cautiously performed in	Multiple myeloma
NOT used to prevent contrast nephropathy	Fenodopam

URINARY BLADDER

GENERAL FEATURES OF BLADDER

Uvula seen in bladder by	Medial lobe of prostate
Trigone of bladder	Mucosa is FIRMLY attached to underlying musculature, Mucosa is smooth, Lined by transitional epithelium, Derived from absorbed part of mesonephric duct
Apex of Bladder gives attachment to	Urachus
Glands in Vesical mucosa	No glands
NOT related to Posterior Surface of Urinary bladder	Ureter
<i>Parasympathetic fibers to urinary bladder is carried by</i>	<i>Pelvic nerve (S2,S3,S4)</i>
Hunner ulcer	Interstitial cystitis/Painful bladder syndrome
<i>Hutch diverticulum is related to</i>	<i>Bladder diverticula</i>
<i>Von Brunn nests within Lamina propria is seen in</i>	<i>Cystitis cystica</i>

Diagnostic finding of uncomplicated acute cystitis	Positive nitrite test, detection of one bacteria per field on gram stain, >10 WBC/HPF
<i>Spinning top deformity for</i>	<i>Overactive bladder</i>
<i>Vincent's curtsy is associated with</i>	<i>Overactive bladder</i>
Relieve urinary spasm after urological procedure	Darifenacin, Oxybutynin, Tolterodine
Used for overactive bladder	Darifenacin, Oxybutynin, Flavoxate
<i>M3 selective antagonist used in treatment of overactive bladder</i>	<i>Tolterodine</i>
Xerostomia is a side effect of which drug used in overactive bladder	Solefenacin
NOT used in detrusor instability	Duloxetine
<i>Even though it is an anticholinergic, NOT used in detrusor instability</i>	<i>Flavoxate</i>
Investigation done to differentiate between stress incontinence and detrusor instability	Urodynamic study
Normal cystometric finding	Absence of systolic detrusor contraction
Cystometric study is indicated in	Neurogenic bladder
Tear drop bladder	Pelvic hematoma, Pelvic lipomatoma
Bladder calcification	Schistosomiasis, TB, Carcinoma
Marjolin's disease	Obstruction of neck of bladder
Marion disease	Muscular hypertrophy of internal sphincter of urinary bladder
Commonest cause of pulsion diverticulum of bladder	Contracture of bladder neck
<i>Malakoplakia of bladder is associated with chronic infection with</i>	<i>E.coli</i>
Michaelis Gutmann bodies seen in	Malakoplakia
<i>Von Hansenmann cells are seen in</i>	<i>Malakoplakia</i>

URINARY BLADDER CANCER

Congenital anomaly associated with increased risk of bladder carcinoma	Bladder exstrophy
Transitional cell carcinoma of bladder associated with	Schistosomiasis, Naphthylamine, Smoking, Aniline, Radiation
Transitional cell carcinoma of bladder can be caused by	2-naphthylamine
Aniline dyes	Ca urinary bladder
Associated with bladder cancer	Naphthylamine
Benzene exposure causes	Carcinoma bladder
Squamous cell carcinoma of bladder	Stone, Schistosomiasis, Chronic cystitis
Squamous cell carcinoma of bladder	Solid, bladder stone, bilharziasis, involve muscle
<i>Grade 3 intraepithelial dysplasia is equivalent to</i>	<i>CIS</i>
<i>Paraplegic with long term catheter is associated with</i>	<i>Squamous cell carcinoma of bladder</i>
NOT precancerous for carcinoma bladder	Tuberculosis
MC tumor of urinary bladder	Transitional cell carcinoma
90% Bladder carcinoma are	Transitional Cell Carcinoma
Most malignant carcinoma of bladder	Solid tumor

Majority of malignant neoplasm of bladder in males	Transitional cell carcinoma
Bladder carcinoma frequently located in	Trigone
Bladder tumor commonly arise from	Mucosa
Carcinoma urinary bladder presents as	Hematuria
Most consistent and persistent feature of ca bladder	Hematuria
Gross painless hematuria in smoker	Carcinoma urinary bladder
T2 transitional cell carcinoma of bladder	70% chance of requiring cystectomy in 5 years after TUR
Stage II transitional cell carcinoma	70% chance of requiring systectomy in 5 years after TUR
<i>Bladder cancer beyond muscularis mucosa</i>	<i>T3a</i>
60 year male smoker history of painless gross hematuria	Urine microscopy and malignant cytology
Most effective intravesical therapy for superficial bladder carcinoma	BCG
Bladder carcinoma, Grade III transitional cell carcinoma without muscle invasion	Intravesical BCG
<i>Treatment of BCG resistant bladder cancer</i>	<i>Valrubicin</i>
Treatment of T1N1 ca bladder	Transurethral resection with intravesical chemoimmunotherapy
Treatment of Stage A (superficial and submucosal)	Local excision, intravesical chemotherapy
<i>Structures removed during cystectomy</i>	<i>Entire bladder, perivesical fat and nodes, prostate</i>

BLADDER INJURIES

Patient with pelvic fracture presents with anuria. After 24 hours bladder is NOT palpable. possible diagnosis	Extraperitoneal rupture of bladder
In extraperitoneal rupture of bladder, urine extravasates in	Perivesical space
Urine gets collected in which place in case of extraperitoneal rupture of bladder	Above urogenital diaphragm
Tear drop bladder	Perivesical hemorrhage with rupture
Most reliable investigation for bladder rupture	Retrograde cystogram
Investigation of choice for urinary bladder rupture in case of pelvic injury	Cystogram
<i>Most useful investigation in case of bladder injuries</i>	<i>Cystoscopy</i>
<i>Suture for bladder injuries</i>	<i>Absorbable suture</i>

URETHRA

GENERAL FEATURES OF URETHRA

Length of Male Urethra	20 cm
NOT a sphincter of lower genitourinary tract of female	Internal urethral sphincter
During urethral catheterization in male patients, resistance is encountered at	Mid penile urethra, Urogenital diaphragm, Bulbomembranous junction
<i>Cross section of membranous urethra</i>	<i>Stellate</i>

URETHRAL INJURIES

Urethral injury associated with pelvic fracture	Membranous urethra
After pelvic fracture blood in meatus	Posterior urethra is the site of injury, Retrograde urethrography should be done after the patient is stabilized, Foley catheter may be carefully passed if the RGU is normal, Rectal examination may reveal a large pelvic hematoma with prostate displaced anteriorly
Blood at external urethral meatus after RTA	Urethral injury
Rupture of urethra above the deep perineal pouch causes urine retention in which region	True pelvis
Injury to male urethra below the perineal membrane causes urine to accumulate in	Superficial perineal pouch
Rupture of membranous urethra occurs more commonly due to	Fixity of urethra
Membranous urethral rupture cause collection of blood in	Deep perineal pouch
Features of bulbar urethral rupture	Perineal hematoma, Collection of urine in perineum, Bleeding per urethra
NOT true about urethral injuries	Catheterize the patient immediately
Urethral injury is NOT characterized by	Blood in rectum
Pelvic fracture and blood at urethral meatus. NOT true	Anterior urethra is the most likely site of injury
Urine extravasation in penile urethral rupture does NOT occur in	Ischiorectal fossa
RTA patient is hemodynamically stable, abdomen is soft, on catheterization of bladder, hematuria is noticed, next step of management should be	CECT
Most important step in management of pelvic fracture and urethral injury	Treatment of shock and hemorrhage
Following trauma, drop of blood in tip of urinary meatus, inability to pass urine	Catheterize, drain bladder, retain catheter thereafter
Treatment of fracture pelvis with rupture urethra is	Suprapubic cystostomy
MC site of urethral carcinoma in men	Bulbomembranous urethra

URETHRAL STRICTURE

Commonest late complication of traumatic rupture of urethra	Stricture
Commonest cause of urethral stricture in young person	Trauma
Commonest cause of obliterative stricture of membranous urethra	RTA with fracture pelvis and rupture urethra
Post gonococcal stricture urethra is most commonly situated at	Bulbar urethral
On exertion, urine stream increase in	Urethral stricture
Chronic urethral obstruction due to benign prostatic hyperplasia can lead to the following change in kidney	Atrophy
NOT a complication of stricture urethra	Papilloma of bladder
NOT an appropriate investigation for anterior urethral stricture	MRI
NOT an appropriate management of anterior urethral stricture	MRI
Optical urethroplasty is done in	Congenital stricture of urethra
Recent treatment of short bridge passable stricture of urethra in the penile and bulbous urethra	Optical internal urethrotomy

URINALYSIS

Coloured urine	Rifampicin, Nitrofurantoin, Pyridium
Coloured urine NOT seen in	Quinine
Normal 24 hour albumin	8-10 mg
Microalbuminuria	30 - 300
Proteinuria	>300
To differentiate glomerular proteinuria from tubular proteinuria, glomerular proteinuria is indicated by	Proteinuria > 3 - 3.5 g/day
Orthostatic proteinuria	Benign
Bence Jones proteinuria may be seen in	Mu heavy chain disease
Sustained proteinuria	>1.2 g/24 hours
Gross painless hematuria in elderly smoker	Carcinoma bladder
Investigations for gross hematuria in elderly	Urine microscopy for malignant cytology, Cystoscopy, Intravenous pyelogram
Painless gross hematuria in 50 year old smoker	Urine microscopy for malignant cytology
Recurrent painless gross hematuria	IgA Nephropathy, Alport syndrome
Urinalysis show RBC casts, likely source	Kidney
Diagnostic of glomerular hematuria	20% dysmorphic RBC, RBC cast, Crenated RBC
Indicative of renal tubular disease	Coarse granular cast
Correlates best with renal pathology	Broad cast
Broad cast is due to	Chronic pyelonephritis
NOT true about renal cast	Albumin secreted from glomeruli from cast
Believed to be contamination rather than true infection	CFU count less than 1000/ml
Asymptomatic bacteriuria	10 ⁵
Treatment for asymptomatic bacteriuria is NOT needed	Pregnancy

in	
Urine of pregnant women in third trimester and lactating mother contains which of the following	Lactose
Pyuria in children	Infection can occur without pyuria, pyuria can present without UTI, isolated pyuria is neither confirmatory nor diagnostic for UTI
UTI in infant	Common in female infants, If two episodes of UTI in females of 7 years occur, then cystometric evaluation is needed, If two episodes of UTI in males of 5 year occur then cystometric evaluation is needed
pH of urine indicating urinary tract infection by Proteus	8
An 8 year old boy during routine checkup if found to have E.coli 1,00,000 cc/ml on a urine culture. Urine specimen by midstream catch. child is asymptomatic	Treat as an acute episode of UTI
A 5 year old male child presents with fever and abdominal distension. Vomiting for last 5 days. 6-8 pus cell/hpf in urine. WBC shows 78% neutrophils. Best line of management	Send urine for culture and sensitivity and start iv antibiotic immediately
Most appropriate method for obtaining a urine specimen for culture in an 8 month old girl	Suprapubic aspiration
Best method of urine collection with least contamination	Suprapubic aspiration
Acts by release of formaldehyde in urinary tract	Methenamine mandelate
Drug of choice in a pregnant woman 2nd trimester presenting with UTI	Ampicillin
Treatment of UTI in pregnant woman	Ampicillin, Cephalosporin
60 year male, fever chills, dysuria hospitalized in emergency medicine for 5 days. Tenderness on per rectal examination. PSA 7. Next	Antibiotics and observe
<i>Young woman with a UTI should be treated with antibiotics for</i>	<i>7 days</i>
Fruit juice preventing UTI	Cranberry

DRUGS ACTING ON KIDNEY

GENERAL FEATURES OF DRUGS ACTING ON KIDNEY

Furosemide and thiazide have similar properties in	Well absorbed orally
Acting on Na + K+ 2Cl- symport	Furosemide, Mersalyl, Ethacrynic acid

LOOP DIURETIC

Furosemide	High ceiling diuretic
Free water clearance decreased by	Furosemide
Furosemide	Acute pulmonary edema is an indication
As compared to Cyclopenthiiazide, Frusemide is	Less potent ,more efficacious
Loop diuretic acts on	Thick ascending limb of loop of henle (Na+ K+ 2Cl-)

Loop diuretics such as furosemide act by	Inhibiting Na ⁺ K ⁺ 2Cl ⁻ co transporter in the medullary thick ascending limb
Furosemide useful in	Refractory edema
Agent will NOT cause rise in K ⁺ levels in chronic renal failure	Furosemide
Furosemide does NOT cause	Acidosis
Hypercalcemia is NOT caused by	Loop diuretic
Furosemide should NOT be administered with NSAIDs because latter	Inhibit prostacyclin synthesis

THIAZIDE DIURETIC

Thiazide diuretics act on	Distal convoluted tubule (Na ⁺ Cl ⁻)
Thiazides act on	Cortical diluting segment of nephron
Thiazide diuretics	Used in CCF, causes hyperglycemia, increases uric acid excretion in serum, increases calcium reabsorption
Diuretic appropriate for combining with ACE inhibitors	Hydrochlorothiazide
Drug increasing concentration of sodium and chloride ions in urine with normal bicarbonate excretion	Ethacrynic acid
Thiazide diuretic is active if GFR is 30-40 ml/min	Metolazone
Thiazide diuretic in renal failure	Metolazone
Diuretic causing hypercalcemia and can be used in recurrent renal calcium stones	Chlorthiazide
Thiazide diuretic does NOT cause	Hyperkalemia
NOT true about thiazide diuretic	Increased calcium excretion
Side effects of thiazide	Hypokalemia, Hyperuricemia, Hyperglycemia
Thiazides cause	Hypercalcemia, Hypokalemia, Metabolic alkalosis
Thiazides can cause	Impotence
<i>Side effect of thiazide diuretic</i>	<i>Neonatal thrombocytopenia</i>
Side effect of Ethacrynic acid	Ototoxicity
Drug causing deafness	Ethacrynic acid
NOT a side effect of thiazide diuretic	Hypoglycemia
NOT a complication of Thiazide diuretic	Metabolic acidosis
Potassium supplements should be given in	Thiazide diuretics

ALDOSTERONE ANTAGONIST

Aldosterone action on	Collecting duct
Does NOT require its presence in tubular lumen for its pharmacological effects	Aldosterone antagonists
Diuretic does NOT require its presence in tubular lumen for pharmacological effects	Aldosterone antagonists
Potassium sparing diuretic	Spironolactone, Triamterene, Amiloride
Potassium conserving diuretic	Spironolactone
Potassium sparing diuretic acts through	Aldosterone receptor
Aldosterone antagonist	Eplerenone
Carnenone is a metabolite of	Spironolactone
Diuretic used in Hypokalemia	Spironolactone

Diuretic preferred in cirrhotic ascites	Spironolactone
Diuretic NOT causing Hyperuricemia	Spironolactone
Amiloride acts on	Cortical collecting duct (Na⁺)
Diuretic NOT causing hypokalemia	Amiloride
Aldosterone antagonist NOT useful in treatment of	Gynecomastia
Drug causing gynecomastia	Spironolactone
<i>Triamterene causes its potassium sparing effect by acting mainly by</i>	<i>Blocking distal tubular sodium channels and ultimately Na⁺ K⁺ exchange</i>
Triamterene cause	Muscle cramps
Spironolactone is contraindicated with	Enalapril
Spironolactone contraindicated with enalapril because it causes	Hyperkalemia

CARBONIC ANHYDRASE INHIBITORS

Acetazolamide is	Carbonic anhydrase ANTAGONIST
Drug can be used for alkalinisation of urine	Acetazolamide
NOT a side effect of acetazolamide	Diarrhea
Acetazolamide can NOT be used in	Cirrhosis
Brinzolamide	Reversible non competitor
Carbonic anhydrase inhibitor should NOT be given in	Sulfonamide hypersensitivity, Metabolic acidosis, COPD

OSMOTIC DIURETICS

Presence of large amount of unreabsorbable solutes in renal tubule causes an increase in urine volume	Osmotic diuresis
Act by inhibiting protein synthesis	Mannitol
Pt with head injury with rapidly increasing ICT without hematoma, drug of choice for initial management	20% mannitol
Diuretic preferred in patient on cisplatin therapy	Mannitol
Diuretic contraindicated in cardiac failure	Mannitol